

Air Quality Analysis Supporting Documentation

The Proposed Action is to recapitalize the T-38C Talon flight training program at Sheppard Air Force Base (AFB), Texas, with T-7A Red Hawk aircraft. The Department of the Air Force (DAF) is considering three alternative ways to implement the Proposed Action (i.e., Alternatives 1, 2, and 3), and the No Action Alternative. Recapitalization would entail introduction of T-7A aircraft and flight operations at Sheppard AFB and associated special use airspace (Hollis, Washita, Westover 1 and Westover 2 Military Operating Areas [MOAs]; Military Training Routes [MTRs] IR-103, VR-158, VR-159, VR-1141, VR-1142, VR-1143, and VR-1146; and Falcon Range [R-5601]) to replace all T-38C aircraft assigned to the installation; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and 16 construction and renovation projects to address operations, support, and maintenance facility requirements.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 also would result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft, and T-7A operations would be approximately 21 percent greater than Alternative 1. Alternative 3 also includes construction of additional aircraft shelters for the additional T-7A aircraft. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The Air Conformity Applicability Model (ACAM) version 5.0.24a was used to perform an analysis to assess the potential air quality impacts associated with the Proposed Action and alternatives. This document provides the ACAM results.

The two regions of influence (ROIs) for this air quality assessment are the Sheppard AFB ROI, within which all Sheppard AFB airfield operations (i.e., takeoffs, landings, and closed patterns) and construction actions would occur, and the SUA ROI, which contains the MOAs, MTRs, and Falcon Range, within which T-7A SUA operations would occur.

The mixing zone is a three-dimensional vertical column of air generally up to 3,000 feet above ground level (AGL) where criteria pollutant emissions, due to atmospheric mixing and dispersion, have the greatest potential to directly impact human health and air quality. As such, criteria pollutant emissions are evaluated within and up to 3,000 feet. For the Proposed Action, no aircraft operations below 3,000 feet AGL occur within Hollis, Washita, Westover 1, and Westover 2 MOAs; therefore, these areas were not considered for criteria pollutant emissions.

Greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere and include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), tropospheric ozone, and several fluorinated and chlorinated gaseous compounds. CO₂, CH₄, and N₂O account for

99.6 percent of all direct GHG emissions in the U.S.¹ GHGs at any altitude, including those above the mixing zone, can contribute to a warming effect within the atmosphere. As such, GHG emissions are evaluated at all altitudes.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

This document is presented in two sections corresponding to two separate air quality ROIs based on regulatory requirements and the physical spatial distribution of the emissions sources associated with the Proposed Action and alternatives. The two ROIs are as follows:

- **Sheppard AFB ROI** – includes all Sheppard AFB airfield operations, personnel changes, construction actions, and facility operations.

Counties included:

Wichita County, TX

- **SUA ROI** – includes aircraft operations within Hollis, Washita, Westover 1, and Westover 2 MOAs; IR-103, VR-158, VR-159, VR-1141, VR-1142, VR-1143, and VR-1146; and R-5601.

Counties included:

Atoka County, OK

Garvin County, OK

Beckham County, OK

Grady County, OK

Bryan County, OK

Greer County, OK

Caddo County, OK

Harmon County, OK

Carter County, OK

Jackson County, OK

Coal County, OK

Jefferson County, OK

Comanche County, OK

Johnston County, OK

¹ USEPA. 2024. Greenhouse Gas Reporting Program (GHGRP) Emissions by GHG. October 15, 2024. Available online: <<https://www.epa.gov/ghgreporting/ghgrp-emissions-ghg>>. Accessed January 3, 2025.

Kiowa County, OK
Love County, OK
Marshall County, OK
Murray County, OK
Pontotoc County, OK
Roger Mills County, OK
Stephens County, OK
Tillman County, OK
Washita County, OK
Archer County, TX
Baylor County, TX
Bosque County, TX
Callahan County, TX
Childress County, TX
Clay County, TX
Collingsworth County, TX
Comanche County, TX
Cooke County, TX
Cottle County, TX
Denton County, TX
Dickens County, TX
Donley County, TX
Eastland County, TX
Erath County, TX
Foard County, TX

Gray County, TX
Grayson County, TX
Hall County, TX
Hamilton County, TX
Hardeman County, TX
Haskell County, TX
Hood County, TX
Jack County, TX
Jones County, TX
Kent County, TX
King County, TX
Knox County, TX
Montague County, TX
Motley County, TX
Palo Pinto County, TX
Shackelford County, TX
Somervell County, TX
Stephens County, TX
Stonewall County, TX
Throckmorton County, TX
Wheeler County, TX
Wichita County, TX
Wilbarger County, TX
Wise County, TX
Young County, TX

Table 1 outlines the attainment status for the counties within the Sheppard AFB and SUA ROIs. Based on compliance with NAAQS, the General Conformity Rule is potentially applicable to emissions of NO_x and VOC from aircraft operations within a portion of the SUA ROI, specifically within VR-1146. To get a better understanding of the potential for the *de minimis* level thresholds to be exceeded in the applicable nonattainment area, a separate emissions assessment was performed to isolate criteria pollutant emissions from aircraft operations within VR-1146.

Table 1. National Ambient Air Quality Standards Attainment Status for All Counties within the Sheppard AFB and SUA ROIs

County	Airspace	Attainment Status	<i>de minimis</i> Threshold
Atoka County, OK	VR-1146	Unclassifiable/Attainment	None
Beckham County, OK	Hollis MOA, VR-1141, VR-1142	Unclassifiable/Attainment	None
Bryan County, OK	VR-1146	Unclassifiable/Attainment	None
Caddo County, OK	Washita MOA, R-5601	Unclassifiable/Attainment	None
Carter County, OK	VR-1146	Unclassifiable/Attainment	None
Coal County, OK	VR-1146	Unclassifiable/Attainment	None
Comanche County, OK	Washita MOA, R-5601	Unclassifiable/Attainment	None
Garvin County, OK	VR-1146	Unclassifiable/Attainment	None
Grady County, OK	Washita MOA, VR-1146	Unclassifiable/Attainment	None
Greer County, OK	Hollis MOA	Unclassifiable/Attainment	None
Harmon County, OK	Hollis MOA	Unclassifiable/Attainment	None
Jackson County, OK	Hollis MOA	Unclassifiable/Attainment	None
Jefferson County, OK	VR-1146	Unclassifiable/Attainment	None
Johnston County, OK	VR-1146	Unclassifiable/Attainment	None
Kiowa County, OK	Washita MOA, R-5601, IR-103	Unclassifiable/Attainment	None
Love County, OK	VR-1146	Unclassifiable/Attainment	None
Marshall County, OK	VR-1146	Unclassifiable/Attainment	None
Murray County, OK	VR-1146	Unclassifiable/Attainment	None
Pontotoc County, OK	VR-1146	Unclassifiable/Attainment	None
Roger Mills County, OK	VR-1141, VR-1142	Unclassifiable/Attainment	None
Stephens County, OK	VR-1146	Unclassifiable/Attainment	None
Tillman County, OK	IR-103	Unclassifiable/Attainment	None
Washita County, OK	Washita MOA	Unclassifiable/Attainment	None
Archer County, TX	Westover 1 MOA, IR-103, VR-158, VR-159, VR-1143	Unclassifiable/Attainment	None
Baylor County, TX	Westover 1 MOA, IR-103, VR-159, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Bosque County, TX	VR-158	Unclassifiable/Attainment	None
Callahan County, TX	VR-1143	Unclassifiable/Attainment	None

EIS for T-7A Recapitalization at Sheppard AFB, Texas
AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

County	Airspace	Attainment Status	<i>de minimis</i> Threshold
Childress County, TX	Hollis MOA, Westover 2 MOA, VR-1143	Unclassifiable/Attainment	None
Clay County, TX	IR-103, VR-158, VR-1146	Unclassifiable/Attainment	None
Collingsworth County, TX	Hollis MOA, VR1141, VR-1142	Unclassifiable/Attainment	None
Comanche County, TX	VR-158	Unclassifiable/Attainment	None
Cooke County, TX	VR-1146	Unclassifiable/Attainment	None
Cottle County, TX	Westover 2 MOA, VR-159, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Denton County, TX	VR-1146	2008 8-hour O ₃ standard (75 ppb): Severe nonattainment	NO _x : 25 tpy VOC: 25 tpy
		2015 8-hour O ₃ standard (70 ppb): Serious nonattainment	NO _x : 50 tpy VOC: 50 tpy
Dickens County, TX	Westover 2 MOA, VR-1143	Unclassifiable/Attainment	None
Donley County, TX	VR-1141, VR-1142	Unclassifiable/Attainment	None
Eastland County, TX	VR-158, VR-1143	Unclassifiable/Attainment	None
Erath County, TX	VR-158	Unclassifiable/Attainment	None
Foard County, TX	Westover 1 MOA, Westover 2 MOA, VR-159, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Gray County, TX	VR-1141, V-1142	Unclassifiable/Attainment	None
Grayson County, TX	VR-1146	Unclassifiable/Attainment	None
Hall County, TX	Westover 2 MOA, VR-1141, VR 1142	Unclassifiable/Attainment	None
Hamilton County, TX	VR-158	Unclassifiable/Attainment	None
Hardeman County, TX	Hollis MOA, Westover 1 MOA, Westover 2 MOA, VR-159, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Haskell County, TX	Westover 1 MOA, Westover 2 MOA, VR-159, VR-1143	Unclassifiable/Attainment	None
Hood County, TX	VR-158	Unclassifiable/Attainment	None
Jack County, TX	IR-103, VR-158, VR-1143, VR-1146	Unclassifiable/Attainment	None
Jones County, TX	Westover 2 MOA, VR-159, VR-1143	Unclassifiable/Attainment	None
Kent County, TX	VR-1143	Unclassifiable/Attainment	None
King County, TX	Westover 2 MOA, VR-159, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Knox County, TX	Westover 1 MOA, Westover 2 MOA, VR-159, VR-1141, VR-1142	Unclassifiable/Attainment	None
Montague County, TX	VR-1146	Unclassifiable/Attainment	None

EIS for T-7A Recapitalization at Sheppard AFB, Texas
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County	Airspace	Attainment Status	<i>de minimis</i> Threshold
Motley County, TX	Westover 2 MOA, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Palo Pinto County, TX	VR-158, VR-1143	Unclassifiable/Attainment	None
Shackelford County, TX	Westover 2 MOA, VR-159, VR-1143	Unclassifiable/Attainment	None
Somervell County, TX	VR-158	Unclassifiable/Attainment	None
Stephens County, TX	VR-158, VR-159, VR-1143	Unclassifiable/Attainment	None
Stonewall County, TX	Westover 2 MOA, VR-159, VR-1143	Unclassifiable/Attainment	None
Throckmorton County, TX	Westover 1 MOA, Westover 2 MOA, VR-159, VR-1143	Unclassifiable/Attainment	None
Wheeler County, TX	VR-1141, VR-1142	Unclassifiable/Attainment	None
Wichita County, TX	Sheppard AFB, IR-103, VR-159, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Wilbarger County, TX	Westover 1 MOA, IR-103, VR-159, VR-1141, VR-1142, VR-1143	Unclassifiable/Attainment	None
Wise County, TX	VR-1146	2008 8-hour O ₃ standard (75 ppb): Severe nonattainment	NOX: 25 tpy VOC: 25 tpy
		2015 8-hour O ₃ standard (70 ppb): Serious nonattainment	NOx: 50 tpy VOC: 50 tpy
Young County, TX	IR-103, VR-158, VR-159, VR-1143	Unclassifiable/Attainment	None

Sources: (1) 40 Code of Federal Regulations (CFR) § 93.153; (2) 40 CFR § 81.337; (3) 40 CFR § 81.344; (4) U.S. Environmental Protection Agency. 2025. Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants, for Texas and Oklahoma. As of March 31, 2025. Available online: <https://www3.epa.gov/airquality/greenbook/anayo_tx.html>. Accessed April 23, 2025.

The emission factors presented in this report are embedded within ACAM. All algorithms, emission factors, and methodologies used in the model are described in detail in the the following DAF documents: (1) *Air Emissions Guide for Air Force Stationary Sources*, (2) *Air Emissions Guide for Air Force Mobile Sources*, and (3) *Air Emissions Guide for Air Force Transitory Sources*. Additional data and methodology used to prepare the ACAM reports are below.

Time in Mode (TIM) Summary for T-7A and T-38C Aircraft Within the ROIs

Table 2. TIM Summary for Sheppard AFB ROI

	Idle In/Out (min)	Takeoff AB (min)	Takeoff Mil (min)	Climbout (min)	Approach (min)
Sheppard AFB T-7A TIM Summary					
LTO Flight	0.00	0.02	0.68	0.99	5.18
LTO Taxi	17.16	0.00	0.00	0.00	0.00
Total LTO	17.16	0.02	0.68	0.99	5.18
Closed Patterns	0.00	0.00	0.34	1.15	1.59
Sheppard AFB T-38C TIM Summary					
LTO Flight	0.00	0.33	0.37	0.99	5.18
LTO Taxi	18.56	0.00	0.00	0.00	0.00
Total LTO	18.56	0.33	0.37	0.99	5.18
Closed Patterns	0.00	0.00	0.34	1.15	1.59

Key: AB = afterburner; LTO = landing and takeoff cycle; mil = military; min = minutes

Table 3. TIM Summary for SUA ROI

	Idle In/Out (min)	Takeoff AB (min)	Takeoff Mil (min)	Climbout (min)	Approach (min)
Hollis MOA					
Total LFP	N/A	N/A	N/A	N/A	N/A
Total DC	0.00	0.00	6.00	4.50	19.50
Washita MOA					
Total LFP	N/A	N/A	N/A	N/A	N/A
Total DC	0.00	0.00	7.20	5.40	23.40
Westover 1 MOA					
Total LF	N/A	N/A	N/A	N/A	N/A
Total DC	0.00	0.00	9.00	3.60	23.40
Westover 2 MOA					
Total LFP	N/A	N/A	N/A	N/A	N/A
Total DC	0.00	0.00	7.50	10.00	7.50

EIS for T-7A Recapitalization at Sheppard AFB, Texas
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	Idle In/Out (min)	Takeoff AB (min)	Takeoff Mil (min)	Climbout (min)	Approach (min)
IR-103					
Total LFP	0.00	0.00	20.00	0.00	0.00
Total DC	0.00	0.00	20.00	0.00	0.00
VR-158					
Total LFP	0.00	0.00	35.00	0.00	0.00
Total DC	0.00	0.00	35.00	0.00	0.00
VR-159					
Total LFP	0.00	0.00	34.00	0.00	0.00
Total DC	0.00	0.00	34.00	0.00	0.00
VR-1141					
Total LFP	0.00	0.00	36.00	0.00	0.00
Total DC	0.00	0.00	36.00	0.00	0.00
VR-1142					
Total LFP	0.00	0.00	36.00	0.00	0.00
Total DC	0.00	0.00	36.00	0.00	0.00
VR-1143					
Total LFP	0.00	0.00	41.00	0.00	0.00
Total DC	0.00	0.00	41.00	0.00	0.00
VR-1146					
Total LFP	0.00	0.00	38.00	0.00	0.00
Total DC	0.00	0.00	38.00	0.00	0.00
R-5601					
Total LFP	0.00	0.00	0.00	0.43	0.40
Total DC	0.00	0.00	0.00	0.43	0.40

Key: AB = afterburner; DC = destination cycle; LFP = low flight pattern; mil = military; min = minutes; N/A = not applicable

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Sheppard AFB ROI

Sheppard AFB ROI: Alternative 1 ACAM Report

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB
State: Texas
County(s): Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2031

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

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f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

_____ applicable
 X not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving “steady state” (i.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts on local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact on air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (i.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2031

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.904	250	No
NOx	10.892	250	No
CO	17.239	250	No
SOx	0.028	250	No
PM 10	16.479	250	No
PM 2.5	0.316	250	No
Pb	0.000	25	No
NH3	0.031	250	No

2032

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.734	250	No
NOx	4.898	250	No
CO	7.971	250	No
SOx	0.014	250	No
PM 10	0.152	250	No
PM 2.5	0.130	250	No
Pb	0.000	25	No
NH3	0.019	250	No

2033

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.163	250	No
NOx	0.255	250	No
CO	1.851	250	No
SOx	0.003	250	No
PM 10	0.027	250	No
PM 2.5	0.019	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2034

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	13.151	250	No
NOx	40.740	250	No
CO	-53.603	250	No
SOx	1.772	250	No
PM 10	-1.645	250	No
PM 2.5	-1.471	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2035

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	45.838	250	No
NOx	167.265	250	No
CO	-480.851	250	No
SOx	5.520	250	No
PM 10	-14.619	250	No
PM 2.5	-13.187	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2036

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.323	250	No
NOx	279.975	250	Yes
CO	-959.110	250	No
SOx	8.038	250	No
PM 10	-28.728	250	No
PM 2.5	-25.929	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2037

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	67.305	250	No
NOx	292.905	250	Yes
CO	-1123.426	250	No
SOx	7.401	250	No
PM 10	-33.382	250	No
PM 2.5	-30.141	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	67.305	250	No
NOx	292.905	250	Yes
CO	-1123.426	250	No
SOx	7.401	250	No
PM 10	-33.382	250	No
PM 2.5	-30.141	250	No
Pb	0.000	25	No
NH3	0.000	250	No

The steady state estimated annual net emissions associated with this action exceed the insignificance indicators, indicating a potential for a significant impact on air quality. Therefore, the ACAM analysis is inconclusive and further air quality impact assessment is needed.

Carolyn Hein, Contractor

March 5, 2026

Name, Title

Date

Sheppard AFB ROI: Alternative 1 ACAM Detail Report

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB
State: Texas
County(s): Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2031

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Ground-Based Training System (GBTS) Facility
3.	Heating	GBTS Facility (Heating)
4.	Construction / Demolition	Maintenance Hangar/Unit Maintenance Training (UMT) Facility
5.	Heating	UMT Facility (Heating)
6.	Construction / Demolition	Ramp Expansion
7.	Construction / Demolition	Hush House Pad
8.	Construction / Demolition	T-7A Shelters
9.	Construction / Demolition	Addition to Egress Shop
10.	Heating	Addition to Egress Shop (Heating)
11.	Construction / Demolition	Construct Jet Blast Deflectors
12.	Construction / Demolition	Airfield Improvements
13.	Paint Booth	Airfield Improvements (Painting)
14.	Construction / Demolition	Renovate Squad Operations 1
15.	Construction / Demolition	Renovate Squad Operations 2
16.	Construction / Demolition	Hangar Renovation
17.	Construction / Demolition	Remove Aboveground Service Modules of the CASS
18.	Construction / Demolition	Compass Rose & Trim Pad
19.	Paint Booth	Compass Rose & Trim Pad (Painting)
20.	Construction / Demolition	Munitions Storage for T-7A
21.	Construction / Demolition	Hammerhead Expansion
22.	Construction / Demolition	Support Mechanized Material Handling System (in T-7A parts Warehouse)
23.	Personnel	Transitional Increase of 100 Personnel
24.	Aircraft	2034 Add T-7As and LTOs
25.	Aircraft	2034 Add T-7A CPs
26.	Aircraft	2034 Remove T-38C LTOs
27.	Aircraft	2034 Remove T-38C CPs
28.	Aircraft	2035 Add T-7As and LTOs
29.	Aircraft	2035 Add T-7A CPs
30.	Aircraft	2035 Remove T-38Cs and LTOs
31.	Aircraft	2035 Remove T-38C CPs
32.	Aircraft	2036 Add T-7As and LTOs
33.	Aircraft	2036 Add T-7A CPs
34.	Aircraft	2036 Remove T-38Cs and LTOs
35.	Aircraft	2036 Remove T-38C CPs
36.	Aircraft	2037 Add T-7A LTOs
37.	Aircraft	2037 Add T-7A CPs
38.	Aircraft	2037 Remove T-38Cs and LTOs
39.	Aircraft	2037 Remove T-38C CPs

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ground-Based Training System (GBTS) Facility

- Activity Description:

Construction of the GBTS facility would occur over a 2-year period from January 2031 through December 2032. Construction would include renovation of an existing facility (estimated at 30,000 SF) and construction of a 16,000 SF addition. Associated parking would be constructed along Avenue J (approx. 100,000 SF).

Site grading would occur on the site for new construction and pavements (approx. 116,000 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for site utilities would require approximately 500 feet of excavation. A 3-foot trench width for utilities was assumed, for a total of 1,500 SF. Trenching would begin in March 2032 and last approximately 2 months.

It was assumed 25 percent of the total square footage of the renovations (approx. 30,000 SF) would be construction to equate the renovations ($30,000 \text{ SF} * 0.25 = 7,500 \text{ SF}$). New construction would include a 16,000 SF addition. Total construction for the GBTS facility was estimated at 37,500 SF. The height of construction was assumed to be 30 feet. Construction would begin in May 2031 and last approximately 16 months.

Architectural coatings would be applied to the facility, totaling 46,000 SF. Architectural coating application would begin in September 2032 and last approximately 2 months.

Paving for the parking area would occur on an area totaling approximately 100,000 SF. Paving would begin November 2032 and last approximately 2 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.767447
SO _x	0.004973
NO _x	1.847399
CO	2.857429

Pollutant	Total Emissions (TONs)
PM 10	2.393357
PM 2.5	0.048628
Pb	0.000000
NH ₃	0.005399

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.019673
N ₂ O	0.007686

Pollutant	Total Emissions (TONs)
CO ₂	504.564739
CO ₂ e	507.152392

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 116,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
 20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
 ACRE: Total acres (acres)
 WD: Number of Total Workdays (days)
 2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
 NE: Number of Equipment
 WD: Number of Total Workdays (days)
 H: Hours Worked per Day (hours)
 HP: Equipment Horsepower
 LF: Equipment Load Factor
 EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
 0.002205: Conversion Factor grams to pounds
 2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Workdays (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 16
 Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 37,500
 Height of Building (ft): 30
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 2
 Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 46,000
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 1: Conversion Factor man days to trips (1 trip / 1 man * day)
 WT: Average Worker Round Trip Commute (mile)
 PA: Paint Area (ft²)
 800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
 BA: Area of Building (ft²)
 2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)
 0.0116: Emission Factor (lb/ft²)
 2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 11
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 2
 Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 100,000

- Paving Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15717	0.00487	1.70774	3.37751	0.04850	0.04462
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P : Paving VOC Emissions (TONs)
 2.62: Emission Factor (lb/acre)
 PA: Paving Area (ft²)
 43560: Conversion Factor square feet to acre (43,560 ft² / acre)² / acre)
 2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: GBTS Facility (Heating)

- Activity Description:

Heating/cooling for the GBTS facility addition would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:
 GBTS Facility Addition – 16,000 SF

- Activity Start Date

Start Month: 1
Start Year: 2033

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.002397
SO _x	0.000261
NO _x	0.043581
CO	0.036608

Pollutant	Emissions Per Year (TONs)
PM 10	0.003312
PM 2.5	0.003312
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000985
N ₂ O	0.000985

Pollutant	Emissions Per Year (TONs)
CO ₂	52.305423
CO ₂ e	52.594008

3.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 16,000
 Type of fuel: Natural Gas
 Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
 Heat Value (MMBtu/ft³): 0.00105
 Energy Intensity (MMBtu/ft²): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

3.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1,000,000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Maintenance Hangar/Unit Maintenance Training (UMT) Facility

- Activity Description:

Construction of the UMT facility (46,500 SF) would occur over a 2-year period from January 2031 through December 2032. An approximately 15,000 SF parking area would also be constructed.

Site grading would occur on the site for new construction and pavements (approx. 61,500 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for site utilities would require approximately 500 feet of excavation. A 3-foot trench width for utilities was assumed, for a total of 1,500 SF. Trenching would begin in March 2032 and last approximately 2 months.

Construction would include the 46,500-SF UMT facility. The height of construction was assumed to be 30 feet. Construction would begin in May 2031 and last approximately 16 months.

Architectural coatings would be applied to the facility, totaling 46,500 SF. Architectural coating application would begin in September 2032 and last approximately 2 months.

Paving for the parking area would occur on an area totaling approximately 15,000 SF. Paving would begin November 2032 and last approximately 2 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.759672
SO _x	0.004743
NO _x	1.757835
CO	2.698828

Pollutant	Total Emissions (TONs)
PM 10	1.305911
PM 2.5	0.045534
Pb	0.000000
NH ₃	0.005541

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.018675
N ₂ O	0.008118

Pollutant	Total Emissions (TONs)
CO ₂	482.352228
CO ₂ e	485.026336

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 61,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 16
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 46,500
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 9

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 2

Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 46,500
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 11

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 2

Number of Days: 0

4.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 15,000

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft²)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43,560 ft² / acre)
2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: UMT Facility (Heating)

- Activity Description:

Heating/cooling for the UMT facility would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:
UMT Facility – 46,500 SF

- Activity Start Date

Start Month: 1
Start Year: 2033

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.007892
SO _x	0.000861
NO _x	0.143486
CO	0.120528

Pollutant	Emissions Per Year (TONs)
PM 10	0.010905
PM 2.5	0.010905
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003243
N ₂ O	0.003243

Pollutant	Emissions Per Year (TONs)
CO ₂	172.210119
CO ₂ e	173.160253

5.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 46,500
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft³): 0.00105
Energy Intensity (MMBtu/ft²): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

5.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

5.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1,000,000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ramp Expansion

- Activity Description:

Ramp expansion would include grading and paving new ramp areas. Activities would occur over a 2-year period starting in January 2031.

Site grading would occur on the entire area (approx. 60,000 SF). Site grading would begin in January 2031 and last approximately 12 months.

Paving would occur on approximately 60,000 SF. Paving would begin January 2032 and last approximately 12 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.223808
SO _x	0.004137
NO _x	1.747959
CO	2.696316

Pollutant	Total Emissions (TONs)
PM 10	7.235707
PM 2.5	0.066310
Pb	0.000000
NH ₃	0.003490

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.017588
N ₂ O	0.003891

Pollutant	Total Emissions (TONs)
CO ₂	439.110329
CO ₂ e	440.634041

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 12

Number of Days: 0

6.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 60,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Workdays (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

6.2 Paving Phase

6.2.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 12
 Number of Days: 0

6.2.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 60,000

- Paving Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15717	0.00487	1.70774	3.37751	0.04850	0.04462
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

6.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$\text{VOC}_P = (2.62 * \text{PA}) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43,560 ft² / acre)
2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Hush House Pad

- Activity Description:

Construction of the hush house pad (27,500 SF) would occur over a 2-year period from January 2031 through December 2032.

Site grading would occur on the entire site (27,500 SF). Site grading would begin in January 2031 and last approximately 4 months.

Trenching for the reinforced concrete and utilities would occur over the entire site (27,500 SF). It was assumed excavated fill would be reused in place. Trenching would begin in May 2031 and last approximately 4 months.

Construction of the new hush house pad would total approximately 27,500 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in September 2031 and last approximately 16 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 0
End Month: 2033

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.191392
SO _x	0.003579
NO _x	1.526256
CO	2.354629

Pollutant	Total Emissions (TONs)
PM 10	2.239433
PM 2.5	0.045659
Pb	0.000000
NH ₃	0.003939

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.014222
N ₂ O	0.003307

Pollutant	Total Emissions (TONs)
CO ₂	356.767753
CO ₂ e	358.042202

7.1 Site Grading Phase

7.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 4
Number of Days: 0

7.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 27,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.2 Trenching/Excavating Phase

7.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 4
Number of Days: 0

7.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 27,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

7.3 Building Construction Phase

7.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 16
Number of Days: 0

7.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 27,500
Height of Building (ft): 2
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Concrete/Industrial Saws Composite	1	8
Generator Sets Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	0
Plate Compactors Composite	1	8
Rollers Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VM_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VM_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 BA: Area of Building (ft²)
 BH: Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 100 ft³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: T-7A Shelters

- Activity Description:

Construction of 108 aircraft shelters (sunshades) would occur over a 2-year period from January 2031 through December 2032.

Demolition would be required for the existing T-38C shelters. Demolition would include removal of 131 sunshades totaling approximately 295,000 SF. Demolition would begin in January 2031 and last approximately 12 months.

Construction would include installation of 108 T-7A sunshades totaling approximately 245,000 SF. The height of all sunshades were assumed to be 15 feet. Construction would begin in January 2032 and last approximately 12 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.197240
SO _x	0.004852
NO _x	1.692855
CO	2.765679

Pollutant	Total Emissions (TONs)
PM 10	0.983944
PM 2.5	0.041995
Pb	0.000000
NH ₃	0.011037

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.020087
N ₂ O	0.022457

Pollutant	Total Emissions (TONs)
CO ₂	573.047860
CO ₂ e	579.561591

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 12
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²): 295,000
Height of Building to be demolished (ft): 15

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

8.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (0.00042 * BA * BH) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

0.00042: Emission Factor (lb/ft³)

BA: Area of Building to be demolished (ft²)

BH: Height of Building to be demolished (ft)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building being demolish (ft²)

BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Workdays (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

8.2 Building Construction Phase

8.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 12
 Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 245,000
 Height of Building (ft): 15
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	2	7
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.16757	0.00487	1.25709	1.55759	0.05276	0.04854
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19055	0.00487	1.77383	3.55935	0.05272	0.04850
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.53211	0.00793	4.25580	2.83928	0.16416	0.15103
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.34949	0.00735	3.21107	4.36083	0.03339	0.03072

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30495	570.25522
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30587	570.25615

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

8.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Addition to Egress Shop

- Activity Description:

Construction of the addition to the egress shop would occur over a 2-year period from January 2031 through December 2032.

Site grading would occur on the site of the addition, 3,400 SF. Site grading would begin in January 2031 and last approximately 1 month.

Construction of the egress shop addition would total approximately 3,400 SF. The height of the addition was assumed to be 20 feet. Construction would begin in February 2031 and last approximately 22 months.

Architectural coatings would be applied to the addition, totaling 3,400 SF. Architectural coating application would begin in December 2032 and last approximately 1 month.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.143878
SO _x	0.002583
NO _x	0.805008
CO	1.473874

Pollutant	Total Emissions (TONs)
PM 10	0.063196
PM 2.5	0.026319
Pb	0.000000
NH ₃	0.002309

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.011335
N ₂ O	0.002639

Pollutant	Total Emissions (TONs)
CO ₂	283.411958
CO ₂ e	284.428557

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,400
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

9.2 Building Construction Phase

9.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 2

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 22

Number of Days: 0

9.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 3,400
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

9.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 BA : Area of Building (ft²)
 BH : Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
 HT : Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

9.3 Architectural Coatings Phase

9.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 1
 Number of Days: 0

9.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 3,400
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

10. Heating

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Addition to Egress Shop (Heating)

- Activity Description:

Heating/cooling for the new addition would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:

Addition to the Egress Shop – 3,400 SF

- Activity Start Date

Start Month: 1

Start Year: 2033

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000845
SO _x	0.000092
NO _x	0.015365
CO	0.012906

Pollutant	Emissions Per Year (TONs)
PM 10	0.001168
PM 2.5	0.001168
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000347
N ₂ O	0.000347

Pollutant	Emissions Per Year (TONs)
CO ₂	18.440634
CO ₂ e	18.542376

10.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 3,400

Type of fuel: Natural Gas

Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

Heat Value (MMBtu/ft³): 0.00105

Energy Intensity (MMBtu/ft²): 0.0949

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

10.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

10.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1,000,000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Jet Blast Deflectors

- Activity Description:

Construction of the jet blast deflectors would occur over a 2-year period from January 2031 through December 2032.

Construction of the deflectors would total approximately 2,000 SF. The height of the deflectors was assumed to be 12 feet. Construction would begin in January 2031 and last approximately 24 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 1

End Month: 2033

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.101013
SO _x	0.002586
NO _x	0.774680
CO	1.461830

Pollutant	Total Emissions (TONs)
PM 10	0.027217
PM 2.5	0.024360
Pb	0.000000
NH ₃	0.002352

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.011342
N ₂ O	0.002520

Pollutant	Total Emissions (TONs)
CO ₂	283.219970
CO ₂ e	284.205261

11.1 Building Construction Phase

11.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 24
Number of Days: 0

11.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 2,000
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

11.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Airfield Improvements

- **Activity Description:**

Airfield improvements would include airfield markings, installation of mooring and anchor rods, replacing the aircraft arresting system, and removing aboveground service modules of the Centralized Aircraft Support System (CASS). Activities would occur over a 1-year period starting in January 2031 (painting activities would occur from September through December 2031 and are captured in a separate Paint Booth activity).

Trenching/excavation for the mooring and anchor rods was estimated to occur on 100 SF. Excavation for replacing the arresting system may be required (approx. 1,000 SF). Total excavation was estimated at 1,100 SF. Excavation would begin in January 2031 and last approximately 2 months. Assumed no materials are required to be hauled on- or off-site; excavated spoils will be used on-site.

The construction activity was used to characterize removal of existing airfield markings. Grinders would likely be used to remove existing paint, estimated at 50,000 SF. Paint removal would begin in March 2031 and last approximately 5 months.

- **Activity Start Date**

Start Month: 1
Start Month: 2031

- **Activity End Date**

Indefinite: False
End Month: 7
End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.033345
SO _x	0.000641
NO _x	0.279630
CO	0.393083

Pollutant	Total Emissions (TONs)
PM 10	0.027621
PM 2.5	0.005028
Pb	0.000000
NH ₃	0.000738

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.002210
N ₂ O	0.000640

Pollutant	Total Emissions (TONs)
CO ₂	56.045595
CO ₂ e	56.277179

12.1 Trenching/Excavating Phase

12.1.1 Trenching / Excavating Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 2
Number of Days: 0

12.1.2 Trenching / Excavating Phase Assumptions

- **General Trenching/Excavating Information**

Area of Site to be Trenched/Excavated (ft²): 1,100
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- **Trenching Default Settings**

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

12.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

12.2 Building Construction Phase

12.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 5
 Number of Days: 0

12.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 50,000
 Height of Building (ft): 1
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	2	8
Generator Sets Composite	1	8
Pressure Washers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

12.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Pressure Washers Composite [HP: 14] [LF: 0.3]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.51763	0.00858	4.27809	3.23942	0.16821	0.15476

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pressure Washers Composite [HP: 14] [LF: 0.3]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02346	0.00469	578.39247	580.37736

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

12.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

13. Paint Booth

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Airfield Improvements (Painting)

- **Activity Description:**

Painting activities would be a continuation of the airfield improvements construction activity. Painting was estimated at 150 gallons. Asphalt/Concrete Paint would be used (TT-P-1952E Type III used as surrogate to estimate for VOC content). Painting would begin in August 2031 and last approximately 5 months.

- **Activity Start Date**

Start Month: 8
Start Year: 2031

- **Activity End Date**

Indefinite: No
End Month: 12
End Year: 2031

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Total Emissions (TONs)
VOC	0.011873
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.000000
N ₂ O	0.000000

Pollutant	Total Emissions (TONs)
CO ₂	0.000000
CO ₂ e	0.000000

13.2 Paint Booth Assumptions

- **Paint Booth**

Coating throughput (gallons/year): 150

- **Default Settings Used:** No

- **Paint Booth Consumption**

Coating used: Asphalt/Concrete Paint (TT-P-1952E Type III used as surrogate)
Specific gravity of coating: 1.4
Coating VOC content by weight (%): 6.5
Efficiency of control device (%): 50

13.3 Paint Booth Formula(s)

- **Paint Booth Emissions per Year**

$$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$$

PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)

VOC: Coating VOC content by weight (%)

(VOC / 100): Conversion Factor percent to decimal

CT: Coating throughput (gallons/year)

SG: Specific gravity of coating

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- **Activity Location**

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Renovate Squad Operations 1

- **Activity Description:**

Renovations would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 165,000 SF) would be construction to equate the renovations (165,000 SF * 0.25 = 41,250 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (165,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- **Activity Start Date**

Start Month: 1

Start Month: 2031

- **Activity End Date**

Indefinite: False

End Month: 12

End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	2.036021
SO _x	0.002744
NO _x	0.982507
CO	1.500633

Pollutant	Total Emissions (TONs)
PM 10	0.027778
PM 2.5	0.023494
Pb	0.000000
NH ₃	0.003633

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.010656
N ₂ O	0.005897

Pollutant	Total Emissions (TONs)
CO ₂	280.268179
CO ₂ e	282.129405

14.1 Building Construction Phase

14.1.1 Building Construction Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1

Start Quarter: 1

Start Year: 2031

- **Phase Duration**

Number of Month: 11

Number of Days: 0

14.1.2 Building Construction Phase Assumptions

- **General Building Construction Information**

Building Category: Office or Industrial

Area of Building (ft²): 41,250

Height of Building (ft): 30

Number of Units: N/A

- **Building Construction Default Settings**

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- **Construction Exhaust (default)**

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

14.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

14.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 100 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 BA: Area of Building (ft²)
 BH: Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

14.2 Architectural Coatings Phase

14.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 1
 Number of Days: 0

14.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 165,000
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

14.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

15. Construction / Demolition

15.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Renovate Squad Operations 2

- **Activity Description:**

Renovations would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 100,000 SF) would be construction to equate the renovations (100,000 SF * 0.25 = 25,000 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (100,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- **Activity Start Date**

Start Month: 1
Start Month: 2031

- **Activity End Date**

Indefinite: False
End Month: 12
End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	1.281448
SO _x	0.002710
NO _x	0.968997
CO	1.488778

Pollutant	Total Emissions (TONs)
PM 10	0.026657
PM 2.5	0.023040
Pb	0.000000
NH ₃	0.003041

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.010474
N ₂ O	0.004443

Pollutant	Total Emissions (TONs)
CO ₂	270.068383
CO ₂ e	271.539060

15.1 Building Construction Phase

15.1.1 Building Construction Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 11
Number of Days: 0

15.1.2 Building Construction Phase Assumptions

- **General Building Construction Information**

Building Category: Office or Industrial
Area of Building (ft²): 25,000
Height of Building (ft): 30
Number of Units: N/A

- **Building Construction Default Settings**

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

15.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO_{2e}
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH₄	N₂O	CO₂	CO_{2e}
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

15.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

15.2 Architectural Coatings Phase

15.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

15.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 100,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

15.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

15.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

16. Construction / Demolition

16.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Hangar Renovation

- **Activity Description:**

Modification of either Building 2404, 2406, 2408, or 2410 would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the hangar (approx. 40,000 SF) would be construction to equate the renovations (40,000 SF * 0.25 = 10,000 SF). The height of the hangar was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (40,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- **Activity Start Date**

Start Month: 1
Start Month: 2031

- **Activity End Date**

Indefinite: False
End Month: 12
End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.575177
SO _x	0.002406
NO _x	0.881174
CO	1.389029

Pollutant	Total Emissions (TONs)
PM 10	0.022338
PM 2.5	0.019599
Pb	0.000000
NH ₃	0.002494

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.009110
N ₂ O	0.002861

Pollutant	Total Emissions (TONs)
CO ₂	231.143070
CO ₂ e	232.156290

16.1 Building Construction Phase

16.1.1 Building Construction Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 11
Number of Days: 0

16.1.2 Building Construction Phase Assumptions

- **General Building Construction Information**

Building Category: Office or Industrial
Area of Building (ft²): 10,000
Height of Building (ft): 30
Number of Units: N/A

- **Building Construction Default Settings**

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- **Construction Exhaust (default)**

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6

Equipment Name	Number Of Equipment	Hours Per Day
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

16.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]			
	CH ₄	N ₂ O	CO ₂
Emission Factors	0.02140	0.00428	527.61055
Forklifts Composite [HP: 82] [LF: 0.2]			
	CH ₄	N ₂ O	CO ₂
Emission Factors	0.02138	0.00428	527.07594
Generator Sets Composite [HP: 14] [LF: 0.74]			
	CH ₄	N ₂ O	CO ₂
Emission Factors	0.02305	0.00461	568.30593
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]			
	CH ₄	N ₂ O	CO ₂
Emission Factors	0.02147	0.00429	529.26401

Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

16.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

16.2 Architectural Coatings Phase

16.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 1

Number of Days: 0

16.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential

Total Square Footage (ft²): 40,000

Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

16.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 1: Conversion Factor man days to trips (1 trip / 1 man * day)
 WT: Average Worker Round Trip Commute (mile)
 PA: Paint Area (ft²)
 800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
 BA: Area of Building (ft²)
 2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)
 0.0116: Emission Factor (lb/ft²)
 2000: Conversion Factor pounds to tons

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
 Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Remove Aboveground Service Modules of the CASS

- **Activity Description:**

Removal of T-38C CASS modules would occur over a 1-year period starting in January 2031.

It was assumed approximately 1,000 SF would be excavated and filled for CASS removal. Excavation would begin in January 2031 and last approximately 12 months. Assumed no materials are required to be hauled on- or off-site; excavated spoils will be used on-site.

- **Activity Start Date**

Start Month: 1
Start Month: 2031

- **Activity End Date**

Indefinite: False
End Month: 12
End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.047432
SO _x	0.000912
NO _x	0.417206
CO	0.720250

Pollutant	Total Emissions (TONs)
PM 10	0.127785
PM 2.5	0.007411
Pb	0.000000
NH ₃	0.001162

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.003996
N ₂ O	0.000890

Pollutant	Total Emissions (TONs)
CO ₂	100.176741
CO ₂ e	100.524406

17.1 Trenching/Excavating Phase

17.1.1 Trenching / Excavating Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 12
Number of Days: 0

17.1.2 Trenching / Excavating Phase Assumptions

- **General Trenching/Excavating Information**

Area of Site to be Trenched/Excavated (ft²): 1,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- **Trenching Default Settings**

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- **Construction Exhaust (default)**

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

17.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Workdays (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Workdays (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Compass Rose & Trim Pad

- Activity Description:

Repairs and preparation of existing aircraft pavement for a compass rose and trim pad would occur over a 1-year period starting in January 2031 (compass rose painting activities would occur from November through December 2031 and are captured in a separate Paint Booth activity).

Site grading would occur on the site for the compass rose/trim pad and access road (approx. 30,000 SF). Site grading would begin in January 2031 and last approximately 3 months.

Excavation would occur over the entire site (30,000 SF). It was assumed excavated fill would be reused in place. Trenching would begin in April 2031 and last approximately 3 months.

Construction of the compass rose and trim pad would total approximately 15,000 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in July 2031 and last approximately 3 months.

Paving for the access road would occur on approximately 15,000 SF. Paving would begin in October 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.068650
SO _x	0.001254
NO _x	0.553532
CO	0.812319

Pollutant	Total Emissions (TONs)
PM 10	1.809833
PM 2.5	0.017326
Pb	0.000000
NH ₃	0.001088

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005099
N ₂ O	0.001213

Pollutant	Total Emissions (TONs)
CO ₂	127.632549
CO ₂ e	128.096865

18.1 Site Grading Phase

18.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 3

Number of Days: 0

18.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 30,000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Workdays (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

18.2 Trenching/Excavating Phase

18.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 4
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 3
 Number of Days: 0

18.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 30,000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Workdays (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Workdays (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18.3 Building Construction Phase

18.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 3
Number of Days: 0

18.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 15,000
Height of Building (ft): 2
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	2	8
Generator Sets Composite	1	8
Pressure Washers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

18.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189

Pressure Washers Composite [HP: 14] [LF: 0.3]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.51763	0.00858	4.27809	3.23942	0.16821	0.15476

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pressure Washers Composite [HP: 14] [LF: 0.3]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02346	0.00469	578.39247	580.37736

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18.4 Paving Phase

18.4.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

18.4.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 15,000

- Paving Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43,560 ft² / acre)
2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

19. Paint Booth

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Compass Rose & Trim Pad (Painting)

- Activity Description:

Painting activities would be a continuation of the compass rose & trim pad construction activity. Painting was estimated at 150 gallons. Asphalt/Concrete Paint would be used (TT-P-1952E Type III used as surrogate to estimate for VOC content). Painting would begin in November 2031 and last approximately 2 months.

- Activity Start Date

Start Month: 11
Start Year: 2031

- Activity End Date

Indefinite: No
End Month: 12
End Year: 2031

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.004749
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.000000
N ₂ O	0.000000

Pollutant	Total Emissions (TONs)
CO ₂	0.000000
CO ₂ e	0.000000

19.2 Paint Booth Assumptions

- Paint Booth

Coating throughput (gallons/year): 150

- Default Settings Used: No

- Paint Booth Consumption

Coating used: Asphalt/Concrete Paint (TT-P-1952E Type III used as surrogate)
 Specific gravity of coating: 1.4
 Coating VOC content by weight (%): 6.5
 Efficiency of control device (%): 50

19.3 Paint Booth Formula(s)

- Paint Booth Emissions per Year

$$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$$

PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)

VOC: Coating VOC content by weight (%)

(VOC / 100): Conversion Factor percent to decimal

CT: Coating throughput (gallons/year)

SG: Specific gravity of coating

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Munitions Storage for T-7A

- Activity Description:

Construction of the concrete pad for munitions storage would occur over a 1-year period starting in January 2031.

Site grading would occur on the entire site (3,600 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for the concrete pad would occur over the entire site (3,600 SF). It was assumed excavated fill would be reused in place. Trenching would begin in March 2031 and last approximately 2 months.

Construction of the pad would total approximately 3,600 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in May 2031 and last approximately 8 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.071809
SO _x	0.001359
NO _x	0.582613
CO	0.932667

Pollutant	Total Emissions (TONs)
PM 10	0.165142
PM 2.5	0.019739
Pb	0.000000
NH ₃	0.001377

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005755
N ₂ O	0.001309

Pollutant	Total Emissions (TONs)
CO ₂	144.008411
CO ₂ e	144.516483

20.1 Site Grading Phase

20.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

20.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,600
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

20.2 Trenching/Excavating Phase

20.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 2

Number of Days: 0

20.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 3,600
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

20.3 Building Construction Phase

20.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 8

Number of Days: 0

20.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 3,600

Height of Building (ft): 5

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No

Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	8
Plate Compactors Composite	1	8
Rollers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

20.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

21. Construction / Demolition

21.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Hammerhead Expansion

- Activity Description:

Construction for the hammerhead expansion would occur over a 1-year period starting in January 2031.

Site grading would occur on the entire site (3,500 SF). Site grading would begin in January 2031 and last approximately 2 months.

Excavation would occur over the entire site (3,500 SF). It was assumed excavated fill would be reused in place. Trenching would begin in March 2031 and last approximately 2 months.

Construction of the hammerhead expansion would total approximately 3,500 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in May 2031 and last approximately 8 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.071809
SO _x	0.001359
NO _x	0.582599
CO	0.932655

Pollutant	Total Emissions (TONs)
PM 10	0.161162
PM 2.5	0.019739
Pb	0.000000
NH ₃	0.001376

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005755
N ₂ O	0.001308

Pollutant	Total Emissions (TONs)
CO ₂	143.997949
CO ₂ e	144.505622

21.1 Site Grading Phase

21.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

21.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928

Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Workdays (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

21.2 Trenching/Excavating Phase

21.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 2
 Number of Days: 0

21.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 3,500
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipmen Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

21.3 Building Construction Phase

21.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 8
 Number of Days: 0

21.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 3,500
 Height of Building (ft): 5
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	8
Plate Compactors Composite	1	8
Rollers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

21.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

22. Construction / Demolition

22.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Support Mechanized Material Handling System (in T-7A parts Warehouse)

- Activity Description:

Renovations for interior electrical support would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 10,000 SF) would be construction to equate the renovations (10,000 SF * 0.25 = 2,500 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 12 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.050581
SO _x	0.001297
NO _x	0.389086
CO	0.732447

Pollutant	Total Emissions (TONs)
PM 10	0.013753
PM 2.5	0.012239
Pb	0.000000
NH ₃	0.001253

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005695
N ₂ O	0.001448

Pollutant	Total Emissions (TONs)
CO ₂	142.928113
CO ₂ e	143.471229

22.1 Building Construction Phase

22.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 12
Number of Days: 0

22.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 2,500
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

22.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

22.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

23. Personnel

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Transitional Increase of 100 Personnel

- Activity Description:

Increase of 100 personnel during the T-7A and T-38C transition period (i.e., 2033 through 2036). Assumed all personnel commute daily.

- Activity Start Date

Start Month: 1
Start Year: 2033

- Activity End Date

Indefinite: No
End Month: 12
End Year: 2036

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.607366
SO _x	0.005903
NO _x	0.211956
CO	6.723078

Pollutant	Total Emissions (TONs)
PM 10	0.045211
PM 2.5	0.016428
Pb	0.000000
NH ₃	0.088579

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.027749
N ₂ O	0.012380

Pollutant	Total Emissions (TONs)
CO ₂	753.334934
CO ₂ e	757.394193

23.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 100
Civilian Personnel: 0
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

23.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

23.4 Personnel Emission Factor(s)

- On Road Vehicle Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25418	0.00210	0.06585	2.90895	0.01876	0.00647	0.04233
LDGT	0.20052	0.00286	0.09270	2.68756	0.01996	0.00714	0.03585
HDGV	0.52890	0.00655	0.29513	6.07732	0.04127	0.01931	0.08206
LDDV	0.09228	0.00124	0.14059	7.44001	0.02278	0.00874	0.01684
LDDT	0.07431	0.00115	0.12481	2.41221	0.01970	0.00705	0.01527
HDDV	0.05762	0.00390	1.37962	1.33933	0.12436	0.04792	0.06921
MC	2.54108	0.00304	0.60490	11.11798	0.03078	0.02161	0.05640

- On Road Vehicle Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01002	0.00438	267.46963	268.91076
LDGT	0.01058	0.00613	364.36705	366.28905
HDGV	0.03206	0.02033	834.70184	840.98717
LDDV	0.04934	0.00067	368.02625	369.58553
LDDT	0.02373	0.00098	344.66551	345.59058
HDDV	0.02092	0.16975	1164.86428	1210.43459
MC	0.09969	0.00284	394.07263	397.61557

23.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Workdays per Year

$$VMT_P = NP * WD * AC$$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Workdays per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Add T-7As and LTOs

- Activity Description:

In 2034, add 28 T-7As and 2,646 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 953 CPs.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	20.537982
SO _x	1.590575
NO _x	19.785336
CO	65.957790

Pollutant	Emissions Per Year (TONs)
PM 10	1.215401
PM 2.5	1.111898
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.188406
N ₂ O	0.036142

Pollutant	Emissions Per Year (TONs)
CO ₂	4651.541883
CO ₂ e	4666.394913

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	19.059971
SO _x	1.213310
NO _x	13.431044
CO	39.652896

Pollutant	Emissions Per Year (TONs)
PM 10	0.288689
PM 2.5	0.255386
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.146472
N ₂ O	0.027931

Pollutant	Emissions Per Year (TONs)
CO ₂	3649.640288
CO ₂ e	3661.143321

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.162803
SO _x	0.290536
NO _x	3.943155
CO	25.784768

Pollutant	Emissions Per Year (TONs)
PM 10	0.574064
PM 2.5	0.515552
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.036575
N ₂ O	0.007136

Pollutant	Emissions Per Year (TONs)
CO ₂	869.825578
CO ₂ e	872.740655

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.315208
SO _x	0.086729
NO _x	2.411136
CO	0.520126

Pollutant	Emissions Per Year (TONs)
PM 10	0.352647
PM 2.5	0.340960
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005359
N ₂ O	0.001075

Pollutant	Emissions Per Year (TONs)
CO ₂	132.076016
CO ₂ e	132.510936

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2,646
Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 17.16
Approach [Approach] (mins): 5.18
Climb Out [Intermediate] (mins): 0.99
Takeoff [Military] (mins): 0.68
Takeoff [Afterburn] (mins): 0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 10
Intermediate (mins): 7.5
Military (mins): 2
Afterburn (mins): 0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
 TD: Test Duration (min)
 60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1,000 pounds
 EF: Emission Factor (lb/1,000 lb fuel)
 NE: Number of Engines
 NA: Number of Aircraft
 NTT: Number of Trim Test
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

24.4 Auxiliary Power Unit (APU)

24.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

24.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

24.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$\text{APU}_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

24.5 Aircraft Engine Test Cell

24.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 28

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 3

Idle Duration (mins): 0

Approach Duration (mins): 0

Intermediate Duration (mins): 12

Military Duration (mins): 8

Afterburner Duration (mins): 7

24.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

24.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellIPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellIPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellIPS}_{\text{IDLE}} + \text{TestCellIPS}_{\text{APPROACH}} + \text{TestCellIPS}_{\text{INTERMEDIATE}} + \text{TestCellIPS}_{\text{MILITARY}} + \text{TestCellIPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellIPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellIPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellIPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellIPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellIPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

24.6 Aerospace Ground Equipment (AGE)

24.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 2646

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

24.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

24.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034 Add T-7A CPs

- **Activity Description:**

In 2034, add 10,121 T-7A CPs not included in LTOs.

953 CPs included in LTOs + 10,121 CPs not included in LTOs = 11,074 CPs in 2034.

- **Activity Start Date**

Start Month: 1
Start Year: 2034

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	2.474996
SO _x	1.384387
NO _x	22.387582
CO	3.974190

Pollutant	Emissions Per Year (TONs)
PM 10	0.157380
PM 2.5	0.134757
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174278
N ₂ O	0.034002

Pollutant	Emissions Per Year (TONs)
CO ₂	4144.673850
CO ₂ e	4158.564039

- **Activity Emissions of Criteria Pollutants [CP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	2.474996
SO _x	1.384387
NO _x	22.387582
CO	3.974190

Pollutant	Emissions Per Year (TONs)
PM 10	0.157380
PM 2.5	0.134757
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174278
N ₂ O	0.034002

Pollutant	Emissions Per Year (TONs)
CO ₂	4144.673850
CO ₂ e	4158.564039

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	10,121
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Remove T-38C LTOs

- Activity Description:

In 2034, decrease T-38C LTOs by 2,315.

Includes 833 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-8.168078
SO _x	-0.726629
NO _x	-1.216621
CO	-91.273668

Pollutant	Emissions Per Year (TONs)
PM 10	-2.214141
PM 2.5	-1.991854
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.091474
N ₂ O	-0.017847

Pollutant	Emissions Per Year (TONs)
CO ₂	-2175.432134
CO ₂ e	-2182.722736

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-8.168078
SO _x	-0.726629
NO _x	-1.216621
CO	-91.273668

Pollutant	Emissions Per Year (TONs)
PM 10	-2.214141
PM 2.5	-1.991854
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.091474
N ₂ O	-0.017847

Pollutant	Emissions Per Year (TONs)
CO ₂	-2175.432134
CO ₂ e	-2182.722736

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	2,315
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	18.56
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.37
Takeoff [Afterburn] (mins):	0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

26.4 Auxiliary Power Unit (APU)

26.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

26.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

26.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * EF_{\text{POL}} / 2000$$

APU_{POL} : Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
 EF_{POL} : Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034 Remove T-38C CPs

- **Activity Description:**

In 2034, decrease T-38C CPs by 8,857.

833 CPs included in LTOs + 8,857 CPs not included in LTOs = 9,690 CPs.

- **Activity Start Date**

Start Month: 1
Start Year: 2034

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	-1.856910
SO _x	-0.479348
NO _x	-0.472166
CO	-34.111898

Pollutant	Emissions Per Year (TONs)
PM 10	-0.830242
PM 2.5	-0.744970
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.060344
N ₂ O	-0.011773

Pollutant	Emissions Per Year (TONs)
CO ₂	-1435.104396
CO ₂ e	-1439.913912

- **Activity Emissions of Criteria Pollutants [CP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	-1.856910
SO _x	-0.479348
NO _x	-0.472166
CO	-34.111898

Pollutant	Emissions Per Year (TONs)
PM 10	-0.830242
PM 2.5	-0.744970
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.060344
N ₂ O	-0.011773

Pollutant	Emissions Per Year (TONs)
CO ₂	-1435.104396
CO ₂ e	-1439.913912

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	8,857
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Add T-7As and LTOs

- Activity Description:

In 2035, add 48 T-7As and 10,143 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 3,651 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	75.438865
SO _x	5.019921
NO _x	60.128228
CO	196.876426

Pollutant	Emissions Per Year (TONs)
PM 10	3.390257
PM 2.5	3.125037
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.586607
N ₂ O	0.112086

Pollutant	Emissions Per Year (TONs)
CO ₂	14605.670875
CO ₂ e	14651.798631

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	72.237190
SO _x	4.189398
NO _x	44.125845
CO	150.680151

Pollutant	Emissions Per Year (TONs)
PM 10	1.054332
PM 2.5	0.934220
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.503363
N ₂ O	0.095733

Pollutant	Emissions Per Year (TONs)
CO ₂	12608.249917
CO ₂ e	12647.713205

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.993377
SO _x	0.498061
NO _x	6.759695
CO	44.202460

Pollutant	Emissions Per Year (TONs)
PM 10	0.984110
PM 2.5	0.883803
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.062700
N ₂ O	0.012233

Pollutant	Emissions Per Year (TONs)
CO ₂	1491.129563
CO ₂ e	1496.126838

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.208299
SO _x	0.332462
NO _x	9.242689
CO	1.993815

Pollutant	Emissions Per Year (TONs)
PM 10	1.351814
PM 2.5	1.307014
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.020544
N ₂ O	0.004121

Pollutant	Emissions Per Year (TONs)
CO ₂	506.291395
CO ₂ e	507.958588

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	48
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	10,143
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	17.16
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.68
Takeoff [Afterburn] (mins):	0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28.4 Auxiliary Power Unit (APU)

28.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

28.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

28.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

28.5 Aircraft Engine Test Cell

28.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 48

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	3
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

28.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

28.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

TestCell = TestCellPS_{IDLE} + TestCellPS_{APPROACH} + TestCellPS_{INTERMEDIATE} + TestCellPS_{MILITARY} +
TestCellPS_{AFTERBURN}

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

28.6 Aerospace Ground Equipment (AGE)

28.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 10,143

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

28.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

28.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Add T-7A CPs

- Activity Description:

In 2035, add 38,801 T-7A CPs not included in LTOs.

3,651 CPs included in LTOs + 38,801 CPs not included in LTOs = 42,452.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	9.488421
SO _x	5.307342
NO _x	85.827545
CO	15.235898

Pollutant	Emissions Per Year (TONs)
PM 10	0.603350
PM 2.5	0.516619
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668130
N ₂ O	0.130352

Pollutant	Emissions Per Year (TONs)
CO ₂	15889.486221
CO ₂ e	15942.737209

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	9.488421
SO _x	5.307342
NO _x	85.827545
CO	15.235898

Pollutant	Emissions Per Year (TONs)
PM 10	0.603350
PM 2.5	0.516619
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668130
N ₂ O	0.130352

Pollutant	Emissions Per Year (TONs)
CO ₂	15889.486221
CO ₂ e	15942.737209

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	48
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	38,801
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Remove T-38Cs and LTOs

- Activity Description:

By 2035, remove 28 T-38Cs and 11,577 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 4,168 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-42.956014
SO _x	-4.182744
NO _x	-17.069494
CO	-468.812745

Pollutant	Emissions Per Year (TONs)
PM 10	-12.816678
PM 2.5	-11.633533
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.502235
N ₂ O	-0.098115

Pollutant	Emissions Per Year (TONs)
CO ₂	-11964.389456
CO ₂ e	-12004.452393

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-41.181976
SO _x	-3.719406
NO _x	-6.166981
CO	-462.586571

Pollutant	Emissions Per Year (TONs)
PM 10	-11.221798
PM 2.5	-10.094858
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.468228
N ₂ O	-0.091351

Pollutant	Emissions Per Year (TONs)
CO ₂	-11135.414601
CO ₂ e	-11172.733104

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.394912
SO _x	-0.083873
NO _x	-0.353108
CO	-3.950478

Pollutant	Emissions Per Year (TONs)
PM 10	-0.051949
PM 2.5	-0.046878
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010559
N ₂ O	-0.002060

Pollutant	Emissions Per Year (TONs)
CO ₂	-251.104848
CO ₂ e	-251.946384

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-1.379126
SO _x	-0.379465
NO _x	-10.549404
CO	-2.275697

Pollutant	Emissions Per Year (TONs)
PM 10	-1.542932
PM 2.5	-1.491797
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.023449
N ₂ O	-0.004703

Pollutant	Emissions Per Year (TONs)
CO ₂	-577.870007
CO ₂ e	-579.772905

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	11,577
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	18.56
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.37
Takeoff [Afterburn] (mins):	0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

30.4 Auxiliary Power Unit (APU)

30.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

30.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

30.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$\text{APU}_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

30.5 Aircraft Engine Test Cell

30.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 56

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 2

Idle Duration (mins): 0

Approach Duration (mins): 0

Intermediate Duration (mins): 12

Military Duration (mins): 8

Afterburner Duration (mins): 7

30.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

30.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

30.6 Aerospace Ground Equipment (AGE)

30.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 11,577

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

30.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

30.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Remove T-38C CPs

- Activity Description:

By 2035, remove 44,282 T-38C CPs.

4,168 CPs included in LTOs + 44,282 CPs not included in LTOs = 48,450 CPs in 2035.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-9.283920
SO _x	-2.396576
NO _x	-2.360669
CO	-170.547934

Pollutant	Emissions Per Year (TONs)
PM 10	-4.150931
PM 2.5	-3.724596
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.301700
N ₂ O	-0.058862

Pollutant	Emissions Per Year (TONs)
CO ₂	-7175.035890
CO ₂ e	-7199.081837

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-9.283920
SO _x	-2.396576
NO _x	-2.360669
CO	-170.547934

Pollutant	Emissions Per Year (TONs)
PM 10	-4.150931
PM 2.5	-3.724596
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.301700
N ₂ O	-0.058862

Pollutant	Emissions Per Year (TONs)
CO ₂	-7175.035890
CO ₂ e	-7199.081837

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	44,282
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Add T-7As and LTOs

- Activity Description:

In 2036, add 32 T-7As and 9,482 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 3414 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	69.808902
SO _x	4.459074
NO _x	52.800411
CO	171.905869

Pollutant	Emissions Per Year (TONs)
PM 10	2.894068
PM 2.5	2.674668
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.518958
N ₂ O	0.099041

Pollutant	Emissions Per Year (TONs)
CO ₂	12954.155024
CO ₂ e	12994.931819

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	67.350428
SO _x	3.816238
NO _x	39.653587
CO	140.573681

Pollutant	Emissions Per Year (TONs)
PM 10	0.974276
PM 2.5	0.863628
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.457952
N ₂ O	0.087034

Pollutant	Emissions Per Year (TONs)
CO ₂	11486.771300
CO ₂ e	11522.658033

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.328918
SO _x	0.332041
NO _x	4.506463
CO	29.468307

Pollutant	Emissions Per Year (TONs)
PM 10	0.656073
PM 2.5	0.589202
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.041800
N ₂ O	0.008155

Pollutant	Emissions Per Year (TONs)
CO ₂	994.086375
CO ₂ e	997.417892

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.129556
SO _x	0.310796
NO _x	8.640360
CO	1.863881

Pollutant	Emissions Per Year (TONs)
PM 10	1.263719
PM 2.5	1.221838
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019205
N ₂ O	0.003852

Pollutant	Emissions Per Year (TONs)
CO ₂	473.297349
CO ₂ e	474.855894

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	32
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	9,482
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	17.16
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.68
Takeoff [Afterburn] (mins):	0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

32.4 Auxiliary Power Unit (APU)

32.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

32.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

32.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$\text{APU}_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

32.5 Aircraft Engine Test Cell

32.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 32

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 3

Idle Duration (mins): 0

Approach Duration (mins): 0

Intermediate Duration (mins): 12

Military Duration (mins): 8

Afterburner Duration (mins): 7

32.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

32.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} + \text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

32.6 Aerospace Ground Equipment (AGE)

32.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 9,482

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

32.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

32.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036 Add T-7A CPs

- **Activity Description:**

In 2036, add 36,269 T-7A CPs not included in LTOs.

3,414 CPs included in LTOs + 36,269 CPs not included in LTOs = 39, 683 CPs in 2036.

- **Activity Start Date**

Start Month: 1

Start Year: 2036

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	8.869244
SO _x	4.961005
NO _x	80.226779
CO	14.241664

Pollutant	Emissions Per Year (TONs)
PM 10	0.563977
PM 2.5	0.482907
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.624530
N ₂ O	0.121846

Pollutant	Emissions Per Year (TONs)
CO ₂	14852.601112
CO ₂ e	14902.377151

- **Activity Emissions of Criteria Pollutants [CP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	8.869244
SO _x	4.961005
NO _x	80.226779
CO	14.241664

Pollutant	Emissions Per Year (TONs)
PM 10	0.563977
PM 2.5	0.482907
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.624530
N ₂ O	0.121846

Pollutant	Emissions Per Year (TONs)
CO ₂	14852.601112
CO ₂ e	14902.377151

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	32
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	36,269
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Remove T-38Cs and LTOs

- Activity Description:

By 2036, remove 56 T-38Cs and 11,852 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 4,267 CPs.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-44.688505
SO _x	-4.447580
NO _x	-17.900539
CO	-489.799099

Pollutant	Emissions Per Year (TONs)
PM 10	-13.317476
PM 2.5	-12.086327
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.534997
N ₂ O	-0.104509

Pollutant	Emissions Per Year (TONs)
CO ₂	-12744.016195
CO ₂ e	-12786.691121

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-42.486796
SO _x	-3.891356
NO _x	-6.394328
CO	-479.568390

Pollutant	Emissions Per Year (TONs)
PM 10	-11.633996
PM 2.5	-10.465338
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.489874
N ₂ O	-0.095575

Pollutant	Emissions Per Year (TONs)
CO ₂	-11650.209771
CO ₂ e	-11689.253525

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.789824
SO _x	-0.167746
NO _x	-0.706216
CO	-7.900955

Pollutant	Emissions Per Year (TONs)
PM 10	-0.103898
PM 2.5	-0.093755
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.021117
N ₂ O	-0.004120

Pollutant	Emissions Per Year (TONs)
CO ₂	-502.209696
CO ₂ e	-503.892769

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-1.411886
SO _x	-0.388479
NO _x	-10.799995
CO	-2.329753

Pollutant	Emissions Per Year (TONs)
PM 10	-1.579582
PM 2.5	-1.527233
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.024006
N ₂ O	-0.004815

Pollutant	Emissions Per Year (TONs)
CO ₂	-591.596728
CO ₂ e	-593.544828

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	11,852
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	18.56
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.37
Takeoff [Afterburn] (mins):	0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)
 TD: Test Duration (min)
 60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1,000 pounds
 EF: Emission Factor (lb/1,000 lb fuel)
 NE: Number of Engines
 NA: Number of Aircraft
 NTT: Number of Trim Test
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)
 AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)
 AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
 AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

34.4 Auxiliary Power Unit (APU)

34.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

34.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

34.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
 APU: Number of Auxiliary Power Units
 OH: Operation Hours for Each LTO (hour)
 LTO: Number of LTOs
 EF_{POL}: Emission Factor for Pollutant (lb/hr)
 2000: Conversion Factor pounds to tons

34.5 Aircraft Engine Test Cell

34.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 112

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 2
Idle Duration (mins): 0
Approach Duration (mins): 0
Intermediate Duration (mins): 12
Military Duration (mins): 8
Afterburner Duration (mins): 7

34.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

34.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} + \text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

34.6 Aerospace Ground Equipment (AGE)

34.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 11,852

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

34.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

34.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Remove T-38C CPs

- Activity Description:

By 2036, remove 45,336 T-38C CPs not included in LTOs.

4,267 CPs included in LTOs + 45,336 CPs not included in LTOs = 49,603 CPs in 2036.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-9.504896
SO _x	-2.453620
NO _x	-2.416858
CO	-174.607315

Pollutant	Emissions Per Year (TONs)
PM 10	-4.249731
PM 2.5	-3.813249
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.308881
N ₂ O	-0.060263

Pollutant	Emissions Per Year (TONs)
CO ₂	-7345.816068
CO ₂ e	-7370.434357

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-9.504896
SO _x	-2.453620
NO _x	-2.416858
CO	-174.607315

Pollutant	Emissions Per Year (TONs)
PM 10	-4.249731
PM 2.5	-3.813249
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.308881
N ₂ O	-0.060263

Pollutant	Emissions Per Year (TONs)
CO ₂	-7345.816068
CO ₂ e	-7370.434357

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	45,336
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Add T-7A LTOs

- Activity Description:

In 2037, add 1,544 T-7A LTOs.

Includes 556 CPs

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	10.894454
SO _x	0.580876
NO _x	5.810638
CO	22.774140

Pollutant	Emissions Per Year (TONs)
PM 10	0.154052
PM 2.5	0.136698
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.069467
N ₂ O	0.013177

Pollutant	Emissions Per Year (TONs)
CO ₂	1749.074622
CO ₂ e	1754.511474

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	10.894454
SO _x	0.580876
NO _x	5.810638
CO	22.774140

Pollutant	Emissions Per Year (TONs)
PM 10	0.154052
PM 2.5	0.136698
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.069467
N ₂ O	0.013177

Pollutant	Emissions Per Year (TONs)
CO ₂	1749.074622
CO ₂ e	1754.511474

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 1,544
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 17.16
Approach [Approach] (mins): 5.18
Climb Out [Intermediate] (mins): 0.99
Takeoff [Military] (mins): 0.68
Takeoff [Afterburn] (mins): 0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 10
Intermediate (mins): 7.5
Military (mins): 2
Afterburn (mins): 0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

36.4 Auxiliary Power Unit (APU)

36.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

36.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

36.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Add T-7A CPs

- Activity Description:

In 2037, add 5,904 T-7A CPs not included in LTOs.

556 CPs included in LTOs + 5904 CPs not included in LTOs = 6,460 CPs in 2037.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.443768
SO _x	0.807571
NO _x	13.059607
CO	2.318310

Pollutant	Emissions Per Year (TONs)
PM 10	0.091806
PM 2.5	0.078609
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.101663
N ₂ O	0.019835

Pollutant	Emissions Per Year (TONs)
CO ₂	2417.760538
CO ₂ e	2425.863263

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.443768
SO _x	0.807571
NO _x	13.059607
CO	2.318310

Pollutant	Emissions Per Year (TONs)
PM 10	0.091806
PM 2.5	0.078609
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.101663
N ₂ O	0.019835

Pollutant	Emissions Per Year (TONs)
CO ₂	2417.760538
CO ₂ e	2425.863263

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: CP (Close Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 5,904
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 1.59
 Climb Out [Intermediate] (mins): 1.15
 Takeoff [Military] (mins): 0.34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL} : Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Remove T-38Cs and LTOs

- Activity Description:

By 2037, remove 47 T-38Cs and 3,142 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 1,131 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-12.684719
SO _x	-1.373722
NO _x	-5.246094
CO	-141.434019

Pollutant	Emissions Per Year (TONs)
PM 10	-3.761470
PM 2.5	-3.411681
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.166334
N ₂ O	-0.032487

Pollutant	Emissions Per Year (TONs)
CO ₂	-3961.247924
CO ₂ e	-3974.514235

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-11.647537
SO _x	-1.129948
NO _x	-1.790267
CO	-134.185236

Pollutant	Emissions Per Year (TONs)
PM 10	-3.255518
PM 2.5	-2.928119
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.142247
N ₂ O	-0.027752

Pollutant	Emissions Per Year (TONs)
CO ₂	-3382.916471
CO ₂ e	-3394.253757

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.662888
SO _x	-0.140787
NO _x	-0.592717
CO	-6.631159

Pollutant	Emissions Per Year (TONs)
PM 10	-0.087200
PM 2.5	-0.078688
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.017723
N ₂ O	-0.003458

Pollutant	Emissions Per Year (TONs)
CO ₂	-421.497423
CO ₂ e	-422.910002

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.374295
SO _x	-0.102987
NO _x	-2.863110
CO	-0.617624

Pollutant	Emissions Per Year (TONs)
PM 10	-0.418752
PM 2.5	-0.404874
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006364
N ₂ O	-0.001276

Pollutant	Emissions Per Year (TONs)
CO ₂	-156.834030
CO ₂ e	-157.350477

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: LTO (Landing and Takeoff)
 Number of Annual Flight Operation Cycles for all Aircraft: 3,142
 Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 18.56
 Approach [Approach] (mins): 5.18
 Climb Out [Intermediate] (mins): 0.99
 Takeoff [Military] (mins): 0.37
 Takeoff [Afterburn] (mins): 0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38.4 Auxiliary Power Unit (APU)

38.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

38.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

38.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

38.5 Aircraft Engine Test Cell

38.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 94

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	2
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

38.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

38.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

TestCell = TestCellPS_{IDLE} + TestCellPS_{APPROACH} + TestCellPS_{INTERMEDIATE} + TestCellPS_{MILITARY} + TestCellPS_{AFTERBURN}

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

38.6 Aerospace Ground Equipment (AGE)

38.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 3,142

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

38.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

38.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Remove T-38C CPs

- Activity Description:

By 2037, remove 12,020 T-38C CPs not included in LTOs.

1,131 CPs included in LTOs + 12,020 CPs not included in LTOs = 13,151 CPs in 2037.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-2.520047
SO _x	-0.650532
NO _x	-0.640785
CO	-46.293893

Pollutant	Emissions Per Year (TONs)
PM 10	-1.126737
PM 2.5	-1.011012
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.081894
N ₂ O	-0.015978

Pollutant	Emissions Per Year (TONs)
CO ₂	-1947.606960
CO ₂ e	-1954.134043

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-2.520047
SO _x	-0.650532
NO _x	-0.640785
CO	-46.293893

Pollutant	Emissions Per Year (TONs)
PM 10	-1.126737
PM 2.5	-1.011012
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.081894
N ₂ O	-0.015978

Pollutant	Emissions Per Year (TONs)
CO ₂	-1947.606960
CO ₂ e	-1954.134043

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 12,020
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 1.59
Climb Out [Intermediate] (mins): 1.15
Takeoff [Military] (mins): 0.34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

Sheppard AFB ROI: Alternative 1 GHG Report

AIR CONFORMITY APPLICABILITY MODEL REPORT GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to estimate GHG emissions associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the GHG emissions analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State: Texas

County(s): Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2031

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action's start through the action's "steady state" (SS, net gain/loss in emission stabilized and the action is fully implemented) of emissions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO₂ equivalents (CO₂e). The CO₂e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO₂. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 tons per year (ton/yr) of CO₂e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO₂e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO₂e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected steady state of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e	Threshold	Exceedance
2031	2,707	0.10583419	0.03961577	2,720	68,039	No
2032	1,302	0.04990581	0.02445684	1,310	68,039	No
2033	391	0.01044379	0.00695799	393	68,039	No
2034	5,096	0.20173808	0.04372075	5,113	68,039	No
2035	15,397	0.61069844	0.12125056	15,447	68,039	No
2036	22,398	0.88250002	0.17215747	22,468	68,039	No
2037	20,647	0.80626471	0.15533095	20,711	68,039	No
2038 [SS Year]	20,647	0.80626471	0.15533095	20,711	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. <https://statesummaries.ncics.org/downloads/>).

State's Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2031	700,652,689	3,554,625	135,896	836,194,567
2032	700,652,689	3,554,625	135,896	836,194,567
2033	700,652,689	3,554,625	135,896	836,194,567
2034	700,652,689	3,554,625	135,896	836,194,567
2035	700,652,689	3,554,625	135,896	836,194,567
2036	700,652,689	3,554,625	135,896	836,194,567
2037	700,652,689	3,554,625	135,896	836,194,567
2038 [SS Year]	700,652,689	3,554,625	135,896	836,194,567

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2031	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2032	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2033	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2034	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2035	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2036	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2037	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2038 [SS Year]	5,136,454,179	25,626,912	1,500,708	6,251,695,230

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact on local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where the action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO ₂	CH ₄	N ₂ O	CO ₂ e
2031-2038	State Total	5,605,221,516	28,436,999	1,087,166	6,689,556,535
2031-2038	U.S. Total	41,091,633,432	205,015,293	12,005,661	50,013,561,837
2031-2038	Action	88,585	3.47365	0.718821	88,873
Percent of State Totals		0.00158040%	0.00001222%	0.00006612%	0.00132853%
Percent of U.S. Totals		0.00021558%	0.00000169%	0.00000599%	0.00017770%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00002381%.*

* Global value based on the U.S. emitting 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, <https://www.c2es.org/content/international-emissions>).

Sheppard AFB ROI: Alternative 2 ACAM Report

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State: Texas

County(s): Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2031

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

☐ applicable
☒ not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving “steady state” (i.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts on local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact on air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (i.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2031

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.904	250	No
NOx	10.892	250	No
CO	17.239	250	No
SOx	0.028	250	No
PM 10	16.479	250	No
PM 2.5	0.316	250	No
Pb	0.000	25	No
NH3	0.031	250	No

2032

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.734	250	No
NOx	4.898	250	No
CO	7.971	250	No
SOx	0.014	250	No
PM 10	0.152	250	No
PM 2.5	0.130	250	No
Pb	0.000	25	No
NH3	0.019	250	No

2033

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.163	250	No
NOx	0.255	250	No
CO	1.851	250	No
SOx	0.003	250	No
PM 10	0.027	250	No
PM 2.5	0.019	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2034

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	47.760	250	No
NOx	56.365	250	No
CO	325.798	250	Yes
SOx	5.994	250	No
PM 10	7.481	250	No
PM 2.5	6.736	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2035

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	88.952	250	No
NOx	215.032	250	No
CO	-202.071	250	No
SOx	10.753	250	No
PM 10	-8.605	250	No
PM 2.5	-7.791	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2036

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	120.014	250	No
NOx	356.402	250	Yes
CO	-792.460	250	No
SOx	14.007	250	No
PM 10	-26.088	250	No
PM 2.5	-23.581	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2037

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	116.554	250	No
NOx	372.593	250	Yes
CO	-993.250	250	No
SOx	13.270	250	No
PM 10	-31.820	250	No
PM 2.5	-28.770	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	116.554	250	No
NOx	372.593	250	Yes
CO	-993.250	250	No
SOx	13.270	250	No
PM 10	-31.820	250	No
PM 2.5	-28.770	250	No
Pb	0.000	25	No
NH3	0.000	250	No

The steady state estimated annual net emissions associated with this action exceed the insignificance indicators, indicating a potential for a significant impact on air quality. Therefore, the ACAM analysis is inconclusive and further air quality impact assessment is needed.

Carolyn Hein, Contractor

March 10, 2026

Name, Title

Date

Sheppard AFB ROI: Alternative 2 ACAM Detail Report

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State: Texas

County(s): Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2031

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction

would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Ground-Based Training System (GBTS) Facility
3.	Heating	GBTS Facility (Heating)
4.	Construction / Demolition	Maintenance Hangar/Unit Maintenance Training (UMT) Facility
5.	Heating	UMT Facility (Heating)
6.	Construction / Demolition	Ramp Expansion
7.	Construction / Demolition	Hush House Pad
8.	Construction / Demolition	T-7A Shelters
9.	Construction / Demolition	Addition to Egress Shop
10.	Heating	Addition to Egress Shop (Heating)
11.	Construction / Demolition	Construct Jet Blast Deflectors
12.	Construction / Demolition	Airfield Improvements
13.	Paint Booth	Airfield Improvements (Painting)
14.	Construction / Demolition	Renovate Squad Operations 1
15.	Construction / Demolition	Renovate Squad Operations 2
16.	Construction / Demolition	Hangar Renovation
17.	Construction / Demolition	Remove Aboveground Service Modules of the CASS
18.	Construction / Demolition	Compass Rose & Trim Pad
19.	Paint Booth	Compass Rose & Trim Pad (Painting)
20.	Construction / Demolition	Munitions Storage for T-7A
21.	Construction / Demolition	Hammerhead Expansion
22.	Construction / Demolition	Support Mechanized Material Handling System (in T-7A parts Warehouse)
23.	Personnel	Transitional Increase of 100 Personnel
24.	Aircraft	2034 Add T-7As and LTOs/
25.	Aircraft	2034 Add T-7A CPs
26.	Aircraft	2034 Add T-38C LTOs
27.	Aircraft	2034 Add T-38C CPs
28.	Aircraft	2035 Add T-7As and LTOs
29.	Aircraft	2035 Add T-7A CPs
30.	Aircraft	2035 Remove T-38Cs and LTOs
31.	Aircraft	2035 Remove T-38C CPs
32.	Aircraft	2036 Add T-7As and LTOs
33.	Aircraft	2036 Add T-7A CPs
34.	Aircraft	2036 Remove T-38Cs and LTOs
35.	Aircraft	2036 Remove T-38C CPs
36.	Aircraft	2037 Add T-7A LTOs
37.	Aircraft	2037 Add T-7A CPs
38.	Aircraft	2037 Remove T-38Cs and LTOs
39.	Aircraft	2037 Remove T-38C CPs

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ground-Based Training System (GBTS) Facility

- Activity Description:

Construction of the GBTS facility would occur over a 2-year period from January 2031 through December 2032. Construction would include renovation of an existing facility (estimated at 30,000 SF) and construction of a 16,000 SF addition. Associated parking would be constructed along Avenue J (approx. 100,000 SF).

Site grading would occur on the site for new construction and pavements (approx. 116,000 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for site utilities would require approximately 500 feet of excavation. A 3-foot trench width for utilities was assumed, for a total of 1,500 SF. Trenching would begin in March 2032 and last approximately 2 months.

It was assumed 25 percent of the total square footage of the renovations (approx. 30,000 SF) would be construction to equate the renovations ($30,000 \text{ SF} * 0.25 = 7,500 \text{ SF}$). New construction would include a 16,000 SF addition. Total construction for the GBTS facility was estimated at 37,500 SF. The height of construction was assumed to be 30 feet. Construction would begin in May 2031 and last approximately 16 months.

Architectural coatings would be applied to the facility, totaling 46,000 SF. Architectural coating application would begin in September 2032 and last approximately 2 months.

Paving for the parking area would occur on an area totaling approximately 100,000 SF. Paving would begin November 2032 and last approximately 2 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.767447
SO _x	0.004973
NO _x	1.847399
CO	2.857429

Pollutant	Total Emissions (TONs)
PM 10	2.393357
PM 2.5	0.048628
Pb	0.000000
NH ₃	0.005399

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.019673
N ₂ O	0.007686

Pollutant	Total Emissions (TONs)
CO ₂	504.564739
CO ₂ e	507.152392

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 116,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Workdays (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 2
 Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,500
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 16
 Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 37,500
 Height of Building (ft): 30
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 2
 Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 46,000
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft²)
800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft²)
2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)
0.0116: Emission Factor (lb/ft²)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 11
Start Quarter: 1
Start Year: 2032

- Phase Duration

Number of Month: 2
Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 100,000

- Paving Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15717	0.00487	1.70774	3.37751	0.04850	0.04462
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P : Paving VOC Emissions (TONs)
 2.62: Emission Factor (lb/acre)
 PA: Paving Area (ft²)
 43560: Conversion Factor square feet to acre (43,560 ft² / acre)² / acre)
 2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
 Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: GBTS Facility (Heating)

- Activity Description:

Heating/cooling for the GBTS facility addition would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:

GBTS Facility Addition – 16,000 SF.

- Activity Start Date

Start Month: 1
 Start Year: 2033

- Activity End Date

Indefinite: Yes
 End Month: N/A
 End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.002397
SO _x	0.000261
NO _x	0.043581
CO	0.036608

Pollutant	Emissions Per Year (TONs)
PM 10	0.003312
PM 2.5	0.003312
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000985
N ₂ O	0.000985

Pollutant	Emissions Per Year (TONs)
CO ₂	52.305423
CO ₂ e	52.594008

3.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 16,000
 Type of fuel: Natural Gas
 Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
 Heat Value (MMBtu/ft³): 0.00105
 Energy Intensity (MMBtu/ft²): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

3.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Maintenance Hangar/Unit Maintenance Training (UMT) Facility

- Activity Description:

Construction of the UMT facility (46,500 SF) would occur over a 2-year period from January 2031 through December 2032. An approximately 15,000 SF parking area would also be constructed.

Site grading would occur on the site for new construction and pavements (approx. 61,500 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for site utilities would require approximately 500 feet of excavation. A 3-foot trench width for utilities was assumed, for a total of 1,500 SF. Trenching would begin in March 2032 and last approximately 2 months.

Construction would include the 46,500-SF UMT facility. The height of construction was assumed to be 30 feet. Construction would begin in May 2031 and last approximately 16 months.

Architectural coatings would be applied to the facility, totaling 46,500 SF. Architectural coating application would begin in September 2032 and last approximately 2 months.

Paving for the parking area would occur on an area totaling approximately 15,000 SF. Paving would begin November 2032 and last approximately 2 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.759672
SO _x	0.004743
NO _x	1.757835
CO	2.698828

Pollutant	Total Emissions (TONs)
PM 10	1.305911
PM 2.5	0.045534
Pb	0.000000
NH ₃	0.005541

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.018675
N ₂ O	0.008118

Pollutant	Total Emissions (TONs)
CO ₂	482.352228
CO ₂ e	485.026336

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 61,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 2
 Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,500
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 16
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 46,500
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30593	570.25621

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 9

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 2

Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential

Total Square Footage (ft²): 46,500

Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 11

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 2
Number of Days: 0

4.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 15,000

- Paving Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43,560 ft² / acre)² / acre)
2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: UMT Facility (Heating)

- Activity Description:

Heating/cooling for the UMT facility would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:

UMT Facility – 46,500 SF.

- Activity Start Date

Start Month: 1
Start Year: 2033

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.007892
SO _x	0.000861
NO _x	0.143486
CO	0.120528

Pollutant	Emissions Per Year (TONs)
PM 10	0.010905
PM 2.5	0.010905
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003243
N ₂ O	0.003243

Pollutant	Emissions Per Year (TONs)
CO ₂	172.210119
CO ₂ e	173.160253

5.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 46,500
 Type of fuel: Natural Gas
 Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
 Heat Value (MMBtu/ft³): 0.00105
 Energy Intensity (MMBtu/ft²): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

5.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

5.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ramp Expansion

- Activity Description:

Ramp expansion would include grading and paving new ramp areas. Activities would occur over a 2-year period starting in January 2031.

Site grading would occur on the entire area (approx. 60,000 SF). Site grading would begin in January 2031 and last approximately 12 months.

Paving would occur on approximately 60,000 SF. Paving would begin January 2032 and last approximately 12 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.223808
SO _x	0.004137
NO _x	1.747959
CO	2.696316

Pollutant	Total Emissions (TONs)
PM 10	7.235707
PM 2.5	0.066310
Pb	0.000000
NH ₃	0.003490

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.017588
N ₂ O	0.003891

Pollutant	Total Emissions (TONs)
CO ₂	439.110329
CO ₂ e	440.634041

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 12
Number of Days: 0

6.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 60,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

6.2 Paving Phase

6.2.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 12
 Number of Days: 0

6.2.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 60,000

- Paving Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245

Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15717	0.00487	1.70774	3.37751	0.04850	0.04462
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Rollers Composite [HP: 36] [LF: 0.38]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

6.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft²)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43,560 ft² / acre)² / acre)
2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Hush House Pad

- **Activity Description:**

Construction of the hush house pad (27,500 SF) would occur over a 2-year period from January 2031 through December 2032.

Site grading would occur on the entire site (27,500 SF). Site grading would begin in January 2031 and last approximately 4 months.

Trenching for the reinforced concrete and utilities would occur over the entire site (27,500 SF). It was assumed excavated fill would be reused in place. Trenching would begin in May 2031 and last approximately 4 months.

Construction of the new hush house pad would total approximately 27,500 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in September 2031 and last approximately 16 months.

- **Activity Start Date**

Start Month: 1
Start Year: 2031

- **Activity End Date**

Indefinite: False
End Month: 0
End Year: 2033

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.191392
SO _x	0.003579
NO _x	1.526256
CO	2.354629

Pollutant	Total Emissions (TONs)
PM 10	2.239433
PM 2.5	0.045659
Pb	0.000000
NH ₃	0.003939

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.014222
N ₂ O	0.003307

Pollutant	Total Emissions (TONs)
CO ₂	356.767753
CO ₂ e	358.042202

7.1 Site Grading Phase

7.1.1 Site Grading Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 4
Number of Days: 0

7.1.2 Site Grading Phase Assumptions

- **General Site Grading Information**

Area of Site to be Graded (ft²): 27,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- **Site Grading Default Settings**

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

7.2 Trenching/Excavating Phase

7.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 4
 Number of Days: 0

7.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 27,500
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite} : Amount of Material to be Hauled On-Site (yd³)
 $HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd³)
 HC : Average Hauling Truck Capacity (yd³)
 $(1 / HC)$: Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT : Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Workdays (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

7.3 Building Construction Phase

7.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 16
 Number of Days: 0

7.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 27,500
 Height of Building (ft): 2
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Concrete/Industrial Saws Composite	1	8
Generator Sets Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	0
Plate Compactors Composite	1	8
Rollers Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pavers Composite [HP: 81] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** T-7A Shelters

- **Activity Description:**

Construction of 108 aircraft shelters (sunshades) would occur over a 2-year period from January 2031 through December 2032.

Demolition would be required for the existing T-38C shelters. Demolition would include removal of 131 sunshades totaling approximately 295,000 SF. Demolition would begin in January 2031 and last approximately 12 months.

Construction would include installation of 108 T-7A sunshades totaling approximately 245,000 SF. The height of all sunshades were assumed to be 15 feet. Construction would begin in January 2032 and last approximately 12 months.

- **Activity Start Date**

Start Month: 1
Start Month: 2031

- **Activity End Date**

Indefinite: False
End Month: 12
End Month: 2032

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.197240
SO _x	0.004852
NO _x	1.692855
CO	2.765679

Pollutant	Total Emissions (TONs)
PM 10	0.983944
PM 2.5	0.041995
Pb	0.000000
NH ₃	0.011037

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.020087
N ₂ O	0.022457

Pollutant	Total Emissions (TONs)
CO ₂	573.047860
CO ₂ e	579.561591

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 12
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- **General Demolition Information**

Area of Building to be demolished (ft²): 295,000
Height of Building to be demolished (ft): 15

- **Default Settings Used:** Yes

- **Average Day(s) worked per week:** 5 (default)

- **Construction Exhaust (default)**

Equipment Name	Number Of Equipment	Hours Per Day
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

8.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (0.00042 * BA * BH) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

0.00042: Emission Factor (lb/ft³)

BA: Area of Building to be demolished (ft²)

BH: Height of Building to be demolished (ft)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building being demolish (ft²)

BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

8.2 Building Construction Phase

8.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 12

Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 245,000
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	2	7
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16757	0.00487	1.25709	1.55759	0.05276	0.04854
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19055	0.00487	1.77383	3.55935	0.05272	0.04850
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53211	0.00793	4.25580	2.83928	0.16416	0.15103
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.34949	0.00735	3.21107	4.36083	0.03339	0.03072

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30495	570.25522
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30587	570.25615

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

8.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Addition to Egress Shop

- Activity Description:

Construction of the addition to the egress shop would occur over a 2-year period from January 2031 through December 2032.

Site grading would occur on the site of the addition, 3,400 SF. Site grading would begin in January 2031 and last approximately 1 month.

Construction of the egress shop addition would total approximately 3,400 SF. The height of the addition was assumed to be 20 feet. Construction would begin in February 2031 and last approximately 22 months.

Architectural coatings would be applied to the addition, totaling 3,400 SF. Architectural coating application would begin in December 2032 and last approximately 1 month.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.143878
SO _x	0.002583
NO _x	0.805008
CO	1.473874

Pollutant	Total Emissions (TONs)
PM 10	0.063196
PM 2.5	0.026319
Pb	0.000000
NH ₃	0.002309

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.011335
N ₂ O	0.002639

Pollutant	Total Emissions (TONs)
CO ₂	283.411958
CO ₂ e	284.428557

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,400
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Workdays (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Workdays (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.2 Building Construction Phase

9.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 2
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 22
Number of Days: 0

9.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 3,400
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

9.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.3 Architectural Coatings Phase

9.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2032

- Phase Duration

Number of Month: 1
Number of Days: 0

9.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 3,400
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 1: Conversion Factor man days to trips (1 trip / 1 man * day)
 WT: Average Worker Round Trip Commute (mile)
 PA: Paint Area (ft²)
 800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

10. Heating

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Addition to Egress Shop (Heating)

- Activity Description:

Heating/cooling for the new addition would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:

Addition to the Egress Shop – 3,400 SF.

- Activity Start Date

Start Month: 1

Start Year: 2033

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000845
SO _x	0.000092
NO _x	0.015365
CO	0.012906

Pollutant	Emissions Per Year (TONs)
PM 10	0.001168
PM 2.5	0.001168
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000347
N ₂ O	0.000347

Pollutant	Emissions Per Year (TONs)
CO ₂	18.440634
CO ₂ e	18.542376

10.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 3,400

Type of fuel: Natural Gas

Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

Heat Value (MMBtu/ft³): 0.00105

Energy Intensity (MMBtu/ft²): 0.0949

- **Default Settings Used:** Yes
- **Boiler/Furnace Usage**
 Operating Time Per Year (hours): 900 (default)

10.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

10.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Jet Blast Deflectors

- Activity Description:

Construction of the jet blast deflectors would occur over a 2-year period from January 2031 through December 2032.

Construction of the deflectors would total approximately 2,000 SF. The height of the deflectors was assumed to be 12 feet. Construction would begin in January 2031 and last approximately 24 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 1

End Month: 2033

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.101013
SO _x	0.002586
NO _x	0.774680
CO	1.461830

Pollutant	Total Emissions (TONs)
PM 10	0.027217
PM 2.5	0.024360
Pb	0.000000
NH ₃	0.002352

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.011342
N ₂ O	0.002520

Pollutant	Total Emissions (TONs)
CO ₂	283.219970
CO ₂ e	284.205261

11.1 Building Construction Phase

11.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 24
Number of Days: 0

11.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 2,000
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

11.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Airfield Improvements

- Activity Description:

Airfield improvements would include airfield markings, installation of mooring and anchor rods, replacing the aircraft arresting system, and removing aboveground service modules of the Centralized Aircraft Support System (CASS). Activities would occur over a 1-year period starting in January 2031 (painting activities would occur from September through December 2031 and are captured in a separate Paint Booth activity).

Trenching/excavation for the mooring and anchor rods was estimated to occur on 100 SF. Excavation for replacing the arresting system may be required (approx. 1,000 SF). Total excavation was estimated at 1,100 SF. Excavation would begin in January 2031 and last approximately 2 months. Assumed no materials are required to be hauled on- or off-site; excavated spoils will be used on-site.

The construction activity was used to characterize removal of existing airfield markings. Grinders would likely be used to remove existing paint, estimated at 50,000 SF. Paint removal would begin in March 2031 and last approximately 5 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 7
End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.033345
SO _x	0.000641
NO _x	0.279630
CO	0.393083

Pollutant	Total Emissions (TONs)
PM 10	0.027621
PM 2.5	0.005028
Pb	0.000000
NH ₃	0.000738

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.002210
N ₂ O	0.000640

Pollutant	Total Emissions (TONs)
CO ₂	56.045595
CO ₂ e	56.277179

12.1 Trenching/Excavating Phase

12.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

12.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,100
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

12.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

12.2 Building Construction Phase

12.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 5
 Number of Days: 0

12.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 50,000
 Height of Building (ft): 1
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	2	8
Generator Sets Composite	1	8
Pressure Washers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

12.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Pressure Washers Composite [HP: 14] [LF: 0.3]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.51763	0.00858	4.27809	3.23942	0.16821	0.15476

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pressure Washers Composite [HP: 14] [LF: 0.3]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02346	0.00469	578.39247	580.37736

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

12.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

13. Paint Booth

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Airfield Improvements (Painting)

- **Activity Description:**

Painting activities would be a continuation of the airfield improvements construction activity. Painting was estimated at 150 gallons. Asphalt/Concrete Paint would be used (TT-P-1952E Type III used as surrogate to estimate for VOC content). Painting would begin in August 2031 and last approximately 5 months.

- **Activity Start Date**

Start Month: 8
Start Year: 2031

- **Activity End Date**

Indefinite: No
End Month: 12
End Year: 2031

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Total Emissions (TONs)
VOC	0.011873
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.000000
N ₂ O	0.000000

Pollutant	Total Emissions (TONs)
CO ₂	0.000000
CO ₂ e	0.000000

13.2 Paint Booth Assumptions

- **Paint Booth**

Coating throughput (gallons/year): 150

- **Default Settings Used:** No

- **Paint Booth Consumption**

Coating used: Asphalt/Concrete Paint (TT-P-1952E Type III used as surrogate)
Specific gravity of coating: 1.4
Coating VOC content by weight (%): 6.5
Efficiency of control device (%): 50

13.3 Paint Booth Formula(s)

- **Paint Booth Emissions per Year**

$$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$$

PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)

VOC: Coating VOC content by weight (%)

(VOC / 100): Conversion Factor percent to decimal

CT: Coating throughput (gallons/year)

SG: Specific gravity of coating

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Renovate Squad Operations 1

- Activity Description:

Renovations would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 165,000 SF) would be construction to equate the renovations (165,000 SF * 0.25 = 41,250 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (165,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	2.036021
SO _x	0.002744
NO _x	0.982507
CO	1.500633

Pollutant	Total Emissions (TONs)
PM 10	0.027778
PM 2.5	0.023494
Pb	0.000000
NH ₃	0.003633

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.010656
N ₂ O	0.005897

Pollutant	Total Emissions (TONs)
CO ₂	280.268179
CO ₂ e	282.129405

14.1 Building Construction Phase

14.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 11

Number of Days: 0

14.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 41,250

Height of Building (ft): 30

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

14.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473

Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

14.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.2 Architectural Coatings Phase

14.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

14.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 165,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

14.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

15. Construction / Demolition

15.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Renovate Squad Operations 2

- Activity Description:

Renovations would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 100,000 SF) would be construction to equate the renovations (100,000 SF * 0.25 = 25,000 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (100,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.281448
SO _x	0.002710
NO _x	0.968997
CO	1.488778

Pollutant	Total Emissions (TONs)
PM 10	0.026657
PM 2.5	0.023040
Pb	0.000000
NH ₃	0.003041

- Global Scale Activity Emissions of Greenhouse Gases:

Pollutant	Total Emissions (TONs)
CH ₄	0.010474
N ₂ O	0.004443

Pollutant	Total Emissions (TONs)
CO ₂	270.068383
CO ₂ e	271.539060

15.1 Building Construction Phase

15.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 11

Number of Days: 0

15.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 25,000

Height of Building (ft): 30

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

15.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

15.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

15.2 Architectural Coatings Phase

15.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

15.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 100,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

15.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

15.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

16. Construction / Demolition

16.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Hangar Renovation

- **Activity Description:**

Modification of either Building 2404, 2406, 2408, or 2410 would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the hangar (approx. 40,000 SF) would be construction to equate the renovations (40,000 SF * 0.25 = 10,000 SF). The height of the hangar was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (40,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- **Activity Start Date**

Start Month: 1
Start Month: 2031

- **Activity End Date**

Indefinite: False
End Month: 12
End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.575177
SO _x	0.002406
NO _x	0.881174
CO	1.389029

Pollutant	Total Emissions (TONs)
PM 10	0.022338
PM 2.5	0.019599
Pb	0.000000
NH ₃	0.002494

- **Global Scale Activity Emissions of Greenhouse Gases:**

Pollutant	Total Emissions (TONs)
CH ₄	0.009110
N ₂ O	0.002861

Pollutant	Total Emissions (TONs)
CO ₂	231.143070
CO ₂ e	232.156290

16.1 Building Construction Phase

16.1.1 Building Construction Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 11
Number of Days: 0

16.1.2 Building Construction Phase Assumptions

- **General Building Construction Information**

Building Category: Office or Industrial
Area of Building (ft²): 10,000
Height of Building (ft): 30
Number of Units: N/A

- **Building Construction Default Settings**

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

16.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30593	570.25621

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

16.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

16.2 Architectural Coatings Phase

16.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

16.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 40,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

16.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Remove Aboveground Service Modules of the CASS

- **Activity Description:**

Removal of T-38C CASS modules would occur over a 1-year period starting in January 2031.

It was assumed approximately 1,000 SF would be excavated and filled for CASS removal. Excavation would begin in January 2031 and last approximately 12 months. Assumed no materials are required to be hauled on- or off-site; excavated spoils will be used on-site.

- **Activity Start Date**

Start Month: 1

Start Month: 2031

- **Activity End Date**

Indefinite: False

End Month: 12

End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.047432
SO _x	0.000912
NO _x	0.417206
CO	0.720250

Pollutant	Total Emissions (TONs)
PM 10	0.127785
PM 2.5	0.007411
Pb	0.000000
NH ₃	0.001162

- **Global Scale Activity Emissions of Greenhouse Gases:**

Pollutant	Total Emissions (TONs)
CH ₄	0.003996
N ₂ O	0.000890

Pollutant	Total Emissions (TONs)
CO ₂	100.176741
CO ₂ e	100.524406

17.1 Trenching/Excavating Phase

17.1.1 Trenching / Excavating Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1

Start Quarter: 1

Start Year: 2031

- **Phase Duration**

Number of Month: 12

Number of Days: 0

17.1.2 Trenching / Excavating Phase Assumptions

- **General Trenching/Excavating Information**

Area of Site to be Trenched/Excavated (ft²): 1,000

Amount of Material to be Hauled On-Site (yd³): 0

Amount of Material to be Hauled Off-Site (yd³): 0

- **Trenching Default Settings**

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- **Construction Exhaust (default)**

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gases Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

17.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Workdays (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Workdays (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Compass Rose & Trim Pad

- Activity Description:

Repairs and preparation of existing aircraft pavement for a compass rose and trim pad would occur over a 1-year period starting in January 2031 (compass rose painting activities would occur from November through December 2031 and are captured in a separate Paint Booth activity).

Site grading would occur on the site for the compass rose/trim pad and access road (approx. 30,000 SF). Site grading would begin in January 2031 and last approximately 3 months.

Excavation would occur over the entire site (30,000 SF). It was assumed excavated fill would be reused in place. Trenching would begin in April 2031 and last approximately 3 months.

Construction of the compass rose and trim pad would total approximately 15,000 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in July 2031 and last approximately 3 months.

Paving for the access road would occur on approximately 15,000 SF. Paving would begin in October 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.068650
SO _x	0.001254
NO _x	0.553532
CO	0.812319

Pollutant	Total Emissions (TONs)
PM 10	1.809833
PM 2.5	0.017326
Pb	0.000000
NH ₃	0.001088

- Global Scale Activity Emissions of Greenhouse Gases:

Pollutant	Total Emissions (TONs)
CH ₄	0.005099
N ₂ O	0.001213

Pollutant	Total Emissions (TONs)
CO ₂	127.632549
CO ₂ e	128.096865

18.1 Site Grading Phase

18.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 3

Number of Days: 0

18.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 30,000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Workdays (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

18.2 Trenching/Excavating Phase

18.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 4
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 3
Number of Days: 0

18.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 30,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Workdays (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Workdays (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18.3 Building Construction Phase

18.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 3
Number of Days: 0

18.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 15,000
Height of Building (ft): 2
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	2	8
Generator Sets Composite	1	8
Pressure Washers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

18.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Pressure Washers Composite [HP: 14] [LF: 0.3]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.51763	0.00858	4.27809	3.23942	0.16821	0.15476

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pressure Washers Composite [HP: 14] [LF: 0.3]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02346	0.00469	578.39247	580.37736

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18.4 Paving Phase

18.4.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

18.4.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 15,000

- Paving Default Settings

Default Settings Used: Yes
Averag Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P : Paving VOC Emissions (TONs)
 2.62: Emission Factor (lb/acre)
 PA: Paving Area (ft²)
 43560: Conversion Factor square feet to acre (43,560 ft² / acre)² / acre)
 2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

19. Paint Booth

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Compass Rose & Trim Pad (Painting)

- Activity Description:

Painting activities would be a continuation of the compass rose & trim pad construction activity. Painting was estimated at 150 gallons. Asphalt/Concrete Paint would be used (TT-P-1952E Type III used as surrogate to estimate for VOC content). Painting would begin in November 2031 and last approximately 2 months.

- Activity Start Date

Start Month: 11
Start Year: 2031

- Activity End Date

Indefinite: No
End Month: 12
End Year: 2031

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.004749
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.000000
N ₂ O	0.000000

Pollutant	Total Emissions (TONs)
CO ₂	0.000000
CO ₂ e	0.000000

19.2 Paint Booth Assumptions

- Paint Booth

Coating throughput (gallons/year): 150

- Default Settings Used: No

- Paint Booth Consumption

Coating used: Asphalt/Concrete Paint (TT-P-1952E Type III used as surrogate)
Specific gravity of coating: 1.4
Coating VOC content by weight (%): 6.5
Efficiency of control device (%): 50

19.3 Paint Booth Formula(s)

- Paint Booth Emissions per Year

$$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$$

PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)

VOC: Coating VOC content by weight (%)

(VOC / 100): Conversion Factor percent to decimal

CT: Coating throughput (gallons/year)

SG: Specific gravity of coating

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Munitions Storage for T-7A

- Activity Description:

Construction of the concrete pad for munitions storage would occur over a 1-year period starting in January 2031.

Site grading would occur on the entire site (3,600 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for the concrete pad would occur over the entire site (3,600 SF). It was assumed excavated fill would be reused in place. Trenching would begin in March 2031 and last approximately 2 months.

Construction of the pad would total approximately 3,600 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in May 2031 and last approximately 8 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.071809
SO _x	0.001359
NO _x	0.582613
CO	0.932667

Pollutant	Total Emissions (TONs)
PM 10	0.165142
PM 2.5	0.019739
Pb	0.000000
NH ₃	0.001377

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005755
N ₂ O	0.001309

Pollutant	Total Emissions (TONs)
CO ₂	144.008411
CO ₂ e	144.516483

20.1 Site Grading Phase

20.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

20.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,600
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

20.2 Trenching/Excavating Phase

20.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 2

Number of Days: 0

20.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 3,600
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

20.3 Building Construction Phase

20.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 8

Number of Days: 0

20.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 3,600

Height of Building (ft): 5

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No

Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	8
Plate Compactors Composite	1	8
Rollers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

20.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

21. Construction / Demolition

21.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Hammerhead Expansion

- Activity Description:

Construction for the hammerhead expansion would occur over a 1-year period starting in January 2031.

Site grading would occur on the entire site (3,500 SF). Site grading would begin in January 2031 and last approximately 2 months.

Excavation would occur over the entire site (3,500 SF). It was assumed excavated fill would be reused in place. Trenching would begin in March 2031 and last approximately 2 months.

Construction of the hammerhead expansion would total approximately 3,500 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in May 2031 and last approximately 8 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.071809
SO _x	0.001359
NO _x	0.582599
CO	0.932655

Pollutant	Total Emissions (TONs)
PM 10	0.161162
PM 2.5	0.019739
Pb	0.000000
NH ₃	0.001376

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005755
N ₂ O	0.001308

Pollutant	Total Emissions (TONs)
CO ₂	143.997949
CO ₂ e	144.505622

21.1 Site Grading Phase

21.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

21.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

21.2 Trenching/Excavating Phase

21.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

21.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 3,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

21.3 Building Construction Phase

21.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 8
 Number of Days: 0

21.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 3,500
 Height of Building (ft): 5
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	8
Plate Compactors Composite	1	8
Rollers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

21.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02382	0.00476	587.11055	589.12536

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

22. Construction / Demolition

22.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Support Mechanized Material Handling System (in T-7A parts Warehouse)

- Activity Description:

Renovations for interior electrical support would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 10,000 SF) would be construction to equate the renovations (10,000 SF * 0.25 = 2,500 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 12 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.050581
SO _x	0.001297
NO _x	0.389086
CO	0.732447

Pollutant	Total Emissions (TONs)
PM 10	0.013753
PM 2.5	0.012239
Pb	0.000000
NH ₃	0.001253

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005695
N ₂ O	0.001448

Pollutant	Total Emissions (TONs)
CO ₂	142.928113
CO ₂ e	143.471229

22.1 Building Construction Phase

22.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 12

Number of Days: 0

22.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 2,500

Height of Building (ft): 30

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

22.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

22.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

23. Personnel

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Transitional Increase of 100 Personnel

- Activity Description:

Increase of 100 personnel during the T-7A and T-38C transition period (i.e., 2033 through 2036). Assumed all personnel commute daily.

- Activity Start Date

Start Month: 1

Start Year: 2033

- Activity End Date

Indefinite: No

End Month: 12

End Year: 2036

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.607366
SO _x	0.005903
NO _x	0.211956
CO	6.723078

Pollutant	Total Emissions (TONs)
PM 10	0.045211
PM 2.5	0.016428
Pb	0.000000
NH ₃	0.088579

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.027749
N ₂ O	0.012380

Pollutant	Total Emissions (TONs)
CO ₂	753.334934
CO ₂ e	757.394193

23.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 100

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

23.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

23.4 Personnel Emission Factor(s)

- On Road Vehicle Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25418	0.00210	0.06585	2.90895	0.01876	0.00647	0.04233
LDGT	0.20052	0.00286	0.09270	2.68756	0.01996	0.00714	0.03585
HDGV	0.52890	0.00655	0.29513	6.07732	0.04127	0.01931	0.08206
LDDV	0.09228	0.00124	0.14059	7.44001	0.02278	0.00874	0.01684
LDDT	0.07431	0.00115	0.12481	2.41221	0.01970	0.00705	0.01527
HDDV	0.05762	0.00390	1.37962	1.33933	0.12436	0.04792	0.06921
MC	2.54108	0.00304	0.60490	11.11798	0.03078	0.02161	0.05640

- On Road Vehicle Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01002	0.00438	267.46963	268.91076
LDGT	0.01058	0.00613	364.36705	366.28905
HDGV	0.03206	0.02033	834.70184	840.98717
LDDV	0.04934	0.00067	368.02625	369.58553
LDDT	0.02373	0.00098	344.66551	345.59058
HDDV	0.02092	0.16975	1164.86428	1210.43459
MC	0.09969	0.00284	394.07263	397.61557

23.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Workdays per Year

$$VMT_P = NP * WD * AC$$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Workdays per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)

VMT_{Total} : Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL} : Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Add T-7As and LTOs/

- Activity Description:

In 2034, add 28 T-7As and 3,308 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 1191 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	25.762138
SO _x	2.006583
NO _x	24.966126
CO	84.586104

Pollutant	Emissions Per Year (TONs)
PM 10	1.566520
PM 2.5	1.432357
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.237817
N ₂ O	0.045628

Pollutant	Emissions Per Year (TONs)
CO ₂	5869.387585
CO ₂ e	5888.137924

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	23.817663
SO _x	1.510774
NO _x	16.694210
CO	49.556157

Pollutant	Emissions Per Year (TONs)
PM 10	0.360225
PM 2.5	0.318690
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.182351
N ₂ O	0.034770

Pollutant	Emissions Per Year (TONs)
CO ₂	4544.500170
CO ₂ e	4558.820007

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.550404
SO _x	0.387381
NO _x	5.257540
CO	34.379691

Pollutant	Emissions Per Year (TONs)
PM 10	0.765419
PM 2.5	0.687402
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.048767
N ₂ O	0.009514

Pollutant	Emissions Per Year (TONs)
CO ₂	1159.767438
CO ₂ e	1163.654207

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.394070
SO _x	0.108428
NO _x	3.014376
CO	0.650255

Pollutant	Emissions Per Year (TONs)
PM 10	0.440876
PM 2.5	0.426265
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006700
N ₂ O	0.001344

Pollutant	Emissions Per Year (TONs)
CO ₂	165.119978
CO ₂ e	165.663710

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LTO (Landing and Takeoff)
 Number of Annual Flight Operation Cycles for all Aircraft: 3,308
 Number of Annual Trim Test(s) per Aircraft: 11

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 17.16
 Approach [Approach] (mins): 5.18
 Climb Out [Intermediate] (mins): 0.99
 Takeoff [Military] (mins): 0.68
 Takeoff [Afterburn] (mins): 0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

24.4 Auxiliary Power Unit (APU)

24.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

24.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

24.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

24.5 Aircraft Engine Test Cell

24.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 28

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 4

Idle Duration (mins): 0

Approach Duration (mins): 0

Intermediate Duration (mins): 12

Military Duration (mins): 8

Afterburner Duration (mins): 7

24.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

24.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

24.6 Aerospace Ground Equipment (AGE)

24.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 3308

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

24.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

24.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Add T-7A CPs

- Activity Description:

In 2034, add 12,652 T-7A CPs.

1,191 CPs included in LTOs + 12,652 CPs not included in LTOs = 13,843 CPs in 2034.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	3.093928
SO _x	1.730586
NO _x	27.986137
CO	4.968031

Pollutant	Emissions Per Year (TONs)
PM 10	0.196737
PM 2.5	0.168456
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.217860
N ₂ O	0.042504

Pollutant	Emissions Per Year (TONs)
CO ₂	5181.149446
CO ₂ e	5198.513213

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	3.093928
SO _x	1.730586
NO _x	27.986137
CO	4.968031

Pollutant	Emissions Per Year (TONs)
PM 10	0.196737
PM 2.5	0.168456
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.217860
N ₂ O	0.042504

Pollutant	Emissions Per Year (TONs)
CO ₂	5181.149446
CO ₂ e	5198.513213

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 12,652
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 1.59
Climb Out [Intermediate] (mins): 1.15
Takeoff [Military] (mins): 0.34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Add T-38C LTOs

- Activity Description:

In 2034, increase T-38C LTOs by 4,328.

Includes 1,558 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	15.270601
SO _x	1.358467
NO _x	2.274530
CO	170.640361

Pollutant	Emissions Per Year (TONs)
PM 10	4.139440
PM 2.5	3.723864
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.171014
N ₂ O	0.033365

Pollutant	Emissions Per Year (TONs)
CO ₂	4067.071394
CO ₂ e	4080.701512

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	15.270601
SO _x	1.358467
NO _x	2.274530
CO	170.640361

Pollutant	Emissions Per Year (TONs)
PM 10	4.139440
PM 2.5	3.723864
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.171014
N ₂ O	0.033365

Pollutant	Emissions Per Year (TONs)
CO ₂	4067.071394
CO ₂ e	4080.701512

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	4,328
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	18.56
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.37
Takeoff [Afterburn] (mins):	0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

26.4 Auxiliary Power Unit (APU)

26.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

26.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

26.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * EF_{\text{POL}} / 2000$$

APU_{POL} : Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
 EF_{POL} : Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Add T-38C CPs

- Activity Description:

In 2034, increase T-38C CPs by 16,553.

1,558 CPs included within LTOs + 16,553 CPs not included within LTOs = 18,111 CPs in 2034.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	3.470411
SO _x	0.895861
NO _x	0.882439
CO	63.752314

Pollutant	Emissions Per Year (TONs)
PM 10	1.551654
PM 2.5	1.392287
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.112778
N ₂ O	0.022003

Pollutant	Emissions Per Year (TONs)
CO ₂	2682.091348
CO ₂ e	2691.079934

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	3.470411
SO _x	0.895861
NO _x	0.882439
CO	63.752314

Pollutant	Emissions Per Year (TONs)
PM 10	1.551654
PM 2.5	1.392287
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.112778
N ₂ O	0.022003

Pollutant	Emissions Per Year (TONs)
CO ₂	2682.091348
CO ₂ e	2691.079934

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	16,553
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Add T-7As and LTOs

- Activity Description:

In 2035, add 48 T-7As and 12,679 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 4,564 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	94.447927
SO _x	6.306136
NO _x	75.559373
CO	249.753086

Pollutant	Emissions Per Year (TONs)
PM 10	4.318713
PM 2.5	3.978995
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.737189
N ₂ O	0.140874

Pollutant	Emissions Per Year (TONs)
CO ₂	18350.588045
CO ₂ e	18408.561017

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	90.279688
SO _x	5.226468
NO _x	54.992857
CO	188.324155

Pollutant	Emissions Per Year (TONs)
PM 10	1.316765
PM 2.5	1.166791
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.627909
N ₂ O	0.119413

Pollutant	Emissions Per Year (TONs)
CO ₂	15729.538571
CO ₂ e	15778.764479

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	2.657836
SO _x	0.664081
NO _x	9.012926
CO	58.936613

Pollutant	Emissions Per Year (TONs)
PM 10	1.312147
PM 2.5	1.178404
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.083600
N ₂ O	0.016310

Pollutant	Emissions Per Year (TONs)
CO ₂	1988.172751
CO ₂ e	1994.835783

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.510403
SO _x	0.415586
NO _x	11.553589
CO	2.492317

Pollutant	Emissions Per Year (TONs)
PM 10	1.689801
PM 2.5	1.633800
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.025681
N ₂ O	0.005151

Pollutant	Emissions Per Year (TONs)
CO ₂	632.876723
CO ₂ e	634.960755

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	48
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	12,679
Number of Annual Trim Test(s) per Aircraft:	11

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	17.16
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.68
Takeoff [Afterburn] (mins):	0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

28.4 Auxiliary Power Unit (APU)

28.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

28.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO _{2e}
4501687C	211.0	0.0	0.0	740.4	740.7

28.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * EF_{\text{POL}} / 2000$$

APU_{POL} : Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
 EF_{POL} : Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

28.5 Aircraft Engine Test Cell

28.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 48

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	4
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

28.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

28.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

28.6 Aerospace Ground Equipment (AGE)

28.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 12,679

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

28.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

28.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Add T-7A CPs

- Activity Description:

In 2035, add 48,502 T-7A CPs not included in LTOs.

4,564 CPs included in LTOs + 48,502 CPs not included in LTOs = 53,066 CPs in 2035.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	11.860710
SO _x	6.634280
NO _x	107.286090
CO	19.045168

Pollutant	Emissions Per Year (TONs)
PM 10	0.754199
PM 2.5	0.645784
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.835175
N ₂ O	0.162943

Pollutant	Emissions Per Year (TONs)
CO ₂	19862.164910
CO ₂ e	19928.729675

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	11.860710
SO _x	6.634280
NO _x	107.286090
CO	19.045168

Pollutant	Emissions Per Year (TONs)
PM 10	0.754199
PM 2.5	0.645784
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.835175
N ₂ O	0.162943

Pollutant	Emissions Per Year (TONs)
CO ₂	19862.164910
CO ₂ e	19928.729675

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 48
 Flight Operation Cycle Type: CP (Close Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 48,502
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 1.59
 Climb Out [Intermediate] (mins): 1.15
 Takeoff [Military] (mins): 0.34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Remove T-38Cs and LTOs

- Activity Description:

By 2035, remove 28 T-38Cs and 14,471 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 5,210 CPs.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-53.511745
SO _x	-5.185967
NO _x	-21.227525
CO	-583.483562

Pollutant	Emissions Per Year (TONs)
PM 10	-15.970294
PM 2.5	-14.496483
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.622449
N ₂ O	-0.121600

Pollutant	Emissions Per Year (TONs)
CO ₂	-14828.369574
CO ₂ e	-14878.022234

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-51.392956
SO _x	-4.627771
NO _x	-7.687889
CO	-576.688513

Pollutant	Emissions Per Year (TONs)
PM 10	-13.989714
PM 2.5	-12.584891
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.582580
N ₂ O	-0.113662

Pollutant	Emissions Per Year (TONs)
CO ₂	-13854.939697
CO ₂ e	-13901.372238

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.394912
SO _x	-0.083873
NO _x	-0.353108
CO	-3.950478

Pollutant	Emissions Per Year (TONs)
PM 10	-0.051949
PM 2.5	-0.046878
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010559
N ₂ O	-0.002060

Pollutant	Emissions Per Year (TONs)
CO ₂	-251.104848
CO ₂ e	-251.946384

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-1.723877
SO _x	-0.474323
NO _x	-13.186528
CO	-2.844572

Pollutant	Emissions Per Year (TONs)
PM 10	-1.928631
PM 2.5	-1.864714
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.029310
N ₂ O	-0.005879

Pollutant	Emissions Per Year (TONs)
CO ₂	-722.325030
CO ₂ e	-724.703611

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 14,471
Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 18.56
Approach [Approach] (mins): 5.18
Climb Out [Intermediate] (mins): 0.99
Takeoff [Military] (mins): 0.37
Takeoff [Afterburn] (mins): 0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 10
Intermediate (mins): 7.5
Military (mins): 2
Afterburn (mins): 0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

30.4 Auxiliary Power Unit (APU)

30.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

30.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO _{2e}

30.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$\text{APU}_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

30.5 Aircraft Engine Test Cell

30.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 56

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	2
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

30.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

30.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

30.6 Aerospace Ground Equipment (AGE)

30.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 14,471

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

30.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

30.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Remove T-38C CPs

- Activity Description:

By 2035, remove 55,352 CPs not included in 2035.

5,210 CPs included in LTOs + 55,352 CPs not included in LTOs = 60,562 CPs in 2035.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-11.604796
SO _x	-2.995693
NO _x	-2.950810
CO	-213.182992

Pollutant	Emissions Per Year (TONs)
PM 10	-5.188616
PM 2.5	-4.655703
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.377121
N ₂ O	-0.073576

Pollutant	Emissions Per Year (TONs)
CO ₂	-8968.713847
CO ₂ e	-8998.771010

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-11.604796
SO _x	-2.995693
NO _x	-2.950810
CO	-213.182992

Pollutant	Emissions Per Year (TONs)
PM 10	-5.188616
PM 2.5	-4.655703
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.377121
N ₂ O	-0.073576

Pollutant	Emissions Per Year (TONs)
CO ₂	-8968.713847
CO ₂ e	-8998.771010

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	55,352
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Add T-7As and LTOs

- Activity Description:

In 2036, add 32 T-7As and 11,852 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 4,267 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	87.355908
SO _x	5.594393
NO _x	66.263455
CO	217.310741

Pollutant	Emissions Per Year (TONs)
PM 10	3.671358
PM 2.5	3.391656
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.651286
N ₂ O	0.124307

Pollutant	Emissions Per Year (TONs)
CO ₂	16254.238256
CO ₂ e	16305.415645

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	84.172132
SO _x	4.763193
NO _x	49.454843
CO	175.689912

Pollutant	Emissions Per Year (TONs)
PM 10	1.217011
PM 2.5	1.078821
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.571547
N ₂ O	0.108619

Pollutant	Emissions Per Year (TONs)
CO ₂	14337.193027
CO ₂ e	14381.980295

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.771891
SO _x	0.442721
NO _x	6.008618
CO	39.291075

Pollutant	Emissions Per Year (TONs)
PM 10	0.874765
PM 2.5	0.785602
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055733
N ₂ O	0.010874

Pollutant	Emissions Per Year (TONs)
CO ₂	1325.448501
CO ₂ e	1329.890522

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.411886
SO _x	0.388479
NO _x	10.799995
CO	2.329753

Pollutant	Emissions Per Year (TONs)
PM 10	1.579582
PM 2.5	1.527233
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.024006
N ₂ O	0.004815

Pollutant	Emissions Per Year (TONs)
CO ₂	591.596728
CO ₂ e	593.544828

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	32
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	11,852
Number of Annual Trim Test(s) per Aircraft:	11

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	17.16
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.68
Takeoff [Afterburn] (mins):	0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AE_{\text{PSIDLE}} + AE_{\text{PSAPPROACH}} + AE_{\text{PSINTERMEDIATE}} + AE_{\text{PSMILITARY}} + AE_{\text{PSAFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

AE_{PSIDLE} : Aircraft Emissions for Idle Power Setting (TONs)

$AE_{\text{PSAPPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AE_{\text{PSINTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AE_{\text{PSMILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AE_{\text{PSAFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

32.4 Auxiliary Power Unit (APU)

32.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

32.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

32.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * EF_{\text{POL}} / 2000$$

APU_{POL} : Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL} : Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

32.5 Aircraft Engine Test Cell

32.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 32

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	4
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

32.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

32.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

32.6 Aerospace Ground Equipment (AGE)

32.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 11,852

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

32.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

32.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Add T-7A CPs

- Activity Description:

In 2036, add 45,338 T-7A CPs not included in LTOs.

4,267 CPs included in LTOs + 45,338 CPs not included in LTOs = 49,605 CPs in 2036.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	11.086983
SO _x	6.201496
NO _x	100.287344
CO	17.802767

Pollutant	Emissions Per Year (TONs)
PM 10	0.704999
PM 2.5	0.603657
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.780693
N ₂ O	0.152313

Pollutant	Emissions Per Year (TONs)
CO ₂	18566.468037
CO ₂ e	18628.690487

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	11.086983
SO _x	6.201496
NO _x	100.287344
CO	17.802767

Pollutant	Emissions Per Year (TONs)
PM 10	0.704999
PM 2.5	0.603657
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.780693
N ₂ O	0.152313

Pollutant	Emissions Per Year (TONs)
CO ₂	18566.468037
CO ₂ e	18628.690487

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 32
Flight Operation Cycle Type: CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 45,338
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 1.59
Climb Out [Intermediate] (mins): 1.15
Takeoff [Military] (mins): 0.34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Remove T-38Cs and LTOs

- Activity Description:

By 2036, remove 56 T-38Cs and 14,816 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 5,334 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-55.499558
SO _x	-5.475069
NO _x	-22.159145
CO	-607.243571

Pollutant	Emissions Per Year (TONs)
PM 10	-16.547371
PM 2.5	-15.018526
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.658119
N ₂ O	-0.128563

Pollutant	Emissions Per Year (TONs)
CO ₂	-15677.270194
CO ₂ e	-15729.766798

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-52.944758
SO _x	-4.821692
NO _x	-7.952023
CO	-596.430227

Pollutant	Emissions Per Year (TONs)
PM 10	-14.468862
PM 2.5	-13.015600
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.606992
N ₂ O	-0.118424

Pollutant	Emissions Per Year (TONs)
CO ₂	-14435.514673
CO ₂ e	-14483.892915

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.789824
SO _x	-0.167746
NO _x	-0.706216
CO	-7.900955

Pollutant	Emissions Per Year (TONs)
PM 10	-0.103898
PM 2.5	-0.093755
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.021117
N ₂ O	-0.004120

Pollutant	Emissions Per Year (TONs)
CO ₂	-502.209696
CO ₂ e	-503.892769

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-1.764976
SO _x	-0.485631
NO _x	-13.500905
CO	-2.912388

Pollutant	Emissions Per Year (TONs)
PM 10	-1.974611
PM 2.5	-1.909171
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.030009
N ₂ O	-0.006019

Pollutant	Emissions Per Year (TONs)
CO ₂	-739.545826
CO ₂ e	-741.981114

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	14,816
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	18.56
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.37
Takeoff [Afterburn] (mins):	0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

34.4 Auxiliary Power Unit (APU)

34.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

34.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

34.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

34.5 Aircraft Engine Test Cell

34.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 112

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 2
Idle Duration (mins): 0
Approach Duration (mins): 0
Intermediate Duration (mins): 12
Military Duration (mins): 8
Afterburner Duration (mins): 7

34.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

34.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} + \text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

34.6 Aerospace Ground Equipment (AGE)

34.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 14,816

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

34.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

34.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Remove T-38C CPs

- Activity Description:

By 2036, remove 56,670 T-38C CPs not included in LTOs.

5,334 CPs included in LTOs + 56,670 CPs not included in LTOs = 62,004 CPs in 2036.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-11.881120
SO _x	-3.067025
NO _x	-3.021072
CO	-218.259144

Pollutant	Emissions Per Year (TONs)
PM 10	-5.312164
PM 2.5	-4.766561
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.386101
N ₂ O	-0.075328

Pollutant	Emissions Per Year (TONs)
CO ₂	-9182.270084
CO ₂ e	-9213.042946

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-11.881120
SO _x	-3.067025
NO _x	-3.021072
CO	-218.259144

Pollutant	Emissions Per Year (TONs)
PM 10	-5.312164
PM 2.5	-4.766561
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.386101
N ₂ O	-0.075328

Pollutant	Emissions Per Year (TONs)
CO ₂	-9182.270084
CO ₂ e	-9213.042946

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	56,670
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Add T-7A LTOs

- Activity Description:

In 2037, add 1,929 T-7A LTOs.
Includes 694 CPs.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	13.588042
SO _x	0.714892
NO _x	7.093590
CO	28.434003

Pollutant	Emissions Per Year (TONs)
PM 10	0.191150
PM 2.5	0.169671
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.085426
N ₂ O	0.016196

Pollutant	Emissions Per Year (TONs)
CO ₂	2152.796227
CO ₂ e	2159.480140

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	13.588042
SO _x	0.714892
NO _x	7.093590
CO	28.434003

Pollutant	Emissions Per Year (TONs)
PM 10	0.191150
PM 2.5	0.169671
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.085426
N ₂ O	0.016196

Pollutant	Emissions Per Year (TONs)
CO ₂	2152.796227
CO ₂ e	2159.480140

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 1,929
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 17.16
Approach [Approach] (mins): 5.18
Climb Out [Intermediate] (mins): 0.9
Takeoff [Military] (mins): 0.68
Takeoff [Afterburn] (mins): 0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 10
Intermediate (mins): 7.5
Military (mins): 2
Afterburn (mins): 0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

36.4 Auxiliary Power Unit (APU)

36.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

36.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

36.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Add T-7A CPs

- Activity Description:

In 2037, add 7,381 T-7A CPs not included in LTOs.

694 CPs included in LTOs + 7,381 CPs not included in LTOs = 8,075 CPs in 2037.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.804954
SO _x	1.009600
NO _x	16.326721
CO	2.898280

Pollutant	Emissions Per Year (TONs)
PM 10	0.114773
PM 2.5	0.098275
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.127096
N ₂ O	0.024797

Pollutant	Emissions Per Year (TONs)
CO ₂	3022.610185
CO ₂ e	3032.739964

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.804954
SO _x	1.009600
NO _x	16.326721
CO	2.898280

Pollutant	Emissions Per Year (TONs)
PM 10	0.114773
PM 2.5	0.098275
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.127096
N ₂ O	0.024797

Pollutant	Emissions Per Year (TONs)
CO ₂	3022.610185
CO ₂ e	3032.739964

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: CP (Close Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 7,381
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 1.59
 Climb Out [Intermediate] (mins): 1.15
 Takeoff [Military] (mins): 0.34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Remove T-38Cs and LTOs

- Activity Description:

By 2037, remove 47 T-38Cs and 3,928 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 1,414 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-15.551618
SO _x	-1.646193
NO _x	-6.375401
CO	-172.578201

Pollutant	Emissions Per Year (TONs)
PM 10	-4.617980
PM 2.5	-4.189248
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.198984
N ₂ O	-0.038865

Pollutant	Emissions Per Year (TONs)
CO ₂	-4739.094632
CO ₂ e	-4754.965478

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-14.420802
SO _x	-1.376657
NO _x	-2.203340
CO	-165.174913

Pollutant	Emissions Per Year (TONs)
PM 10	-4.007274
PM 2.5	-3.604403
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.173304
N ₂ O	-0.033812

Pollutant	Emissions Per Year (TONs)
CO ₂	-4121.529714
CO ₂ e	-4135.342340

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.662888
SO _x	-0.140787
NO _x	-0.592717
CO	-6.631159

Pollutant	Emissions Per Year (TONs)
PM 10	-0.087200
PM 2.5	-0.078688
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.017723
N ₂ O	-0.003458

Pollutant	Emissions Per Year (TONs)
CO ₂	-421.497423
CO ₂ e	-422.910002

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.467928
SO _x	-0.128750
NO _x	-3.579344
CO	-0.772129

Pollutant	Emissions Per Year (TONs)
PM 10	-0.523507
PM 2.5	-0.506157
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007956
N ₂ O	-0.001596

Pollutant	Emissions Per Year (TONs)
CO ₂	-196.067495
CO ₂ e	-196.713136

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: LTO (Landing and Takeoff)
 Number of Annual Flight Operation Cycles for all Aircraft: 3,928
 Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 18.56
 Approach [Approach] (mins): 5.18
 Climb Out [Intermediate] (mins): 0.99
 Takeoff [Military] (mins): 0.37
 Takeoff [Afterburn] (mins): 0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38.4 Auxiliary Power Unit (APU)

38.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

38.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

38.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

38.5 Aircraft Engine Test Cell

38.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 94

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	2
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

38.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

38.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} + \text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

38.6 Aerospace Ground Equipment (AGE)

38.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 3,928

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

38.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

38.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$\text{AGE}_{\text{POL}} = \text{AGE} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Remove T-38C CPs

- Activity Description:

By 2037, remove 15,024 T-38C CPs not included in LTOs.

1,414 CPs included in LTOs + 15,024 CPs not included in LTOs = 16,438 CPs in 2037.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-3.149849
SO _x	-0.813111
NO _x	-0.800928
CO	-57.863515

Pollutant	Emissions Per Year (TONs)
PM 10	-1.408328
PM 2.5	-1.263681
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.102361
N ₂ O	-0.019971

Pollutant	Emissions Per Year (TONs)
CO ₂	-2434.346669
CO ₂ e	-2442.504980

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-3.149849
SO _x	-0.813111
NO _x	-0.800928
CO	-57.863515

Pollutant	Emissions Per Year (TONs)
PM 10	-1.408328
PM 2.5	-1.263681
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.102361
N ₂ O	-0.019971

Pollutant	Emissions Per Year (TONs)
CO ₂	-2434.346669
CO ₂ e	-2442.504980

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	15,024
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

Sheppard AFB ROI: Alternative 2 GHG Report

AIR CONFORMITY APPLICABILITY MODEL REPORT GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to estimate GHG emissions associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the GHG emissions analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State: Texas

County(s): Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2031

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action's start through the action's "steady state" (SS, net gain/loss in emission stabilized and the action is fully implemented) of emissions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO₂ equivalents (CO₂e). The CO₂e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO₂. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 tons per year (ton/yr) of CO₂e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO₂e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO₂e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected steady state of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e	Threshold	Exceedance
2031	2,707	0.10583419	0.03961577	2,720	68,039	No
2032	1,302	0.04990581	0.02445684	1,310	68,039	No
2033	391	0.01044379	0.00695799	393	68,039	No
2034	16,539	0.6812795	0.13713959	16,594	68,039	No
2035	29,617	1.20090972	0.23569644	29,713	68,039	No
2036	38,653	1.55267934	0.30167483	38,777	68,039	No
2037	36,670	1.46580779	0.28268009	36,786	68,039	No
2038 [SS Year]	36,670	1.46580779	0.28268009	36,786	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. <https://statesummaries.ncics.org/downloads/>).

State's Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2031	700,652,689	3,554,625	135,896	836,194,567
2032	700,652,689	3,554,625	135,896	836,194,567
2033	700,652,689	3,554,625	135,896	836,194,567
2034	700,652,689	3,554,625	135,896	836,194,567
2035	700,652,689	3,554,625	135,896	836,194,567
2036	700,652,689	3,554,625	135,896	836,194,567
2037	700,652,689	3,554,625	135,896	836,194,567
2038 [SS Year]	700,652,689	3,554,625	135,896	836,194,567

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO2	CH4	N2O	CO2e
2031	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2032	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2033	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2034	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2035	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2036	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2037	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2038 [SS Year]	5,136,454,179	25,626,912	1,500,708	6,251,695,230

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact on local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where the action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO2	CH4	N2O	CO2e
2031-2038	State Total	5,605,221,516	28,436,999	1,087,166	6,689,556,535
2031-2038	U.S. Total	41,091,633,432	205,015,293	12,005,661	50,013,561,837
2031-2038	Action	162,548	6.532668	1.310902	163,078
Percent of State Totals		0.00289994%	0.00002297%	0.00012058%	0.00243781%
Percent of U.S. Totals		0.00039557%	0.00000319%	0.00001092%	0.00032607%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00004369%.*

* Global value based on the U.S. emitting 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, <https://www.c2es.org/content/international-emissions>).

Sheppard AFB ROI: Alternative 3 ACAM Report

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State: Texas

County(s): Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2031

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

	applicable
X	not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving “steady state” (i.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts on local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact on air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (i.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2031

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.904	250	No
NOx	10.892	250	No
CO	17.239	250	No
SOx	0.028	250	No
PM 10	16.479	250	No
PM 2.5	0.316	250	No
Pb	0.000	25	No
NH3	0.031	250	No

2032

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.734	250	No
NOx	4.917	250	No
CO	7.989	250	No
SOx	0.014	250	No
PM 10	0.154	250	No
PM 2.5	0.131	250	No
Pb	0.000	25	No
NH3	0.020	250	No

2033

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.163	250	No
NOx	0.255	250	No
CO	1.851	250	No
SOx	0.003	250	No
PM 10	0.027	250	No
PM 2.5	0.019	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2034

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	13.151	250	No
NOx	40.740	250	No
CO	-53.603	250	No
SOx	1.772	250	No
PM 10	-1.645	250	No
PM 2.5	-1.471	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2035

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	45.845	250	No
NOx	167.265	250	No
CO	-480.837	250	No
SOx	5.520	250	No
PM 10	-14.619	250	No
PM 2.5	-13.187	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2036

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	80.162	250	No
NOx	298.697	250	Yes
CO	-925.863	250	No
SOx	9.357	250	No
PM 10	-28.063	250	No
PM 2.5	-25.326	250	No
Pb	0.000	25	No
NH3	0.022	250	No

2037

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	109.907	250	No
NOx	367.025	250	Yes
CO	-1017.989	250	No
SOx	12.597	250	No
PM 10	-31.200	250	No
PM 2.5	-28.140	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	109.907	250	No
NOx	367.025	250	Yes
CO	-1017.989	250	No
SOx	12.597	250	No
PM 10	-31.200	250	No
PM 2.5	-28.140	250	No
Pb	0.000	25	No
NH3	0.000	250	No

The steady state estimated annual net emissions associated with this action exceed the insignificance indicators, indicating a potential for a significant impact on air quality. Therefore, the ACAM analysis is inconclusive and further air quality impact assessment is needed.

Carolyn Hein, Contractor

March 18, 2026

Name, Title

Date

Sheppard AFB ROI: Alternative 3 ACAM Detail Report

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State: Texas

County(s): Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2031

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031

and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Ground-Based Training System (GBTS) Facility
3.	Heating	GBTS Facility (Heating)
4.	Construction / Demolition	Maintenance Hangar/Unit Maintenance Training (UMT) Facility
5.	Heating	UMT Facility (Heating)
6.	Construction / Demolition	Ramp Expansion
7.	Construction / Demolition	Hush House Pad
8.	Construction / Demolition	T-7A Shelters
9.	Construction / Demolition	Addition to Egress Shop
10.	Heating	Addition to Egress Shop (Heating)
11.	Construction / Demolition	Construct Jet Blast Deflectors
12.	Construction / Demolition	Airfield Improvements
13.	Paint Booth	Airfield Improvements (Painting)
14.	Construction / Demolition	Renovate Squad Operations 1
15.	Construction / Demolition	Renovate Squad Operations 2
16.	Construction / Demolition	Hangar Renovation
17.	Construction / Demolition	Remove Aboveground Service Modules of the CASS
18.	Construction / Demolition	Compass Rose & Trim Pad
19.	Paint Booth	Compass Rose & Trim Pad (Painting)
20.	Construction / Demolition	Munitions Storage for T-7A
21.	Construction / Demolition	Hammerhead Expansion
22.	Construction / Demolition	Support Mechanized Material Handling System (in T-7A parts Warehouse)
23.	Personnel	Transitional Increase of 100 Personnel
24.	Aircraft	2034 Add T-7As and LTOs
25.	Aircraft	2034 Add T-7A CPs
26.	Aircraft	2034 Remove T-38C LTOs
27.	Aircraft	2034 Remove T-38C CPs
28.	Aircraft	2035 Add T-7As and LTOs
29.	Aircraft	2035 Add T-7A CPs
30.	Aircraft	2035 Remove T-38Cs and LTOs
31.	Aircraft	2035 Remove T-38C CPs
32.	Aircraft	2036 Add T-7As and LTOs
33.	Aircraft	2036 Add T-7A CPs
34.	Aircraft	2036 Remove T-38Cs and LTOs
35.	Aircraft	2036 Remove T-38C CPs
36.	Aircraft	2037 Add T-7A LTOs
37.	Aircraft	2037 Add T-7A CPs
38.	Aircraft	2037 Remove T-38Cs and LTOs
39.	Aircraft	2037 Remove T-38C CPs

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ground-Based Training System (GBTS) Facility

- Activity Description:

Construction of the GBTS facility would occur over a 2-year period from January 2031 through December 2032. Construction would include renovation of an existing facility (estimated at 30,000 SF) and construction of a 16,000 SF addition. Associated parking would be constructed along Avenue J (approx. 100,000 SF).

Site grading would occur on the site for new construction and pavements (approx. 116,000 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for site utilities would require approximately 500 feet of excavation. A 3-foot trench width for utilities was assumed, for a total of 1,500 SF. Trenching would begin in March 2032 and last approximately 2 months.

It was assumed 25 percent of the total square footage of the renovations (approx. 30,000 SF) would be construction to equate the renovations ($30,000 \text{ SF} * 0.25 = 7,500 \text{ SF}$). New construction would include a 16,000 SF addition. Total construction for the GBTS facility was estimated at 37,500 SF. The height of construction was assumed to be 30 feet. Construction would begin in May 2031 and last approximately 16 months.

Architectural coatings would be applied to the facility, totaling 46,000 SF. Architectural coating application would begin in September 2032 and last approximately 2 months.

Paving for the parking area would occur on an area totaling approximately 100,000 SF. Paving would begin November 2032 and last approximately 2 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.767447
SO _x	0.004973
NO _x	1.847399
CO	2.857429

Pollutant	Total Emissions (TONs)
PM 10	2.393357
PM 2.5	0.048628
Pb	0.000000
NH ₃	0.005399

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.019673
N ₂ O	0.007686

Pollutant	Total Emissions (TONs)
CO ₂	504.564739
CO ₂ e	507.152392

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 116,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02137	0.00427	526.88032	528.68844

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Workdays (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 2
 Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,500
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gases Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 16
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 37,500
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278

Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 9

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 2

Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 46,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 11

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 2

Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 100,000

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245

Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15717	0.00487	1.70774	3.37751	0.04850	0.04462
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Rollers Composite [HP: 36] [LF: 0.38]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft²)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43,560 ft² / acre)
2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** GBTS Facility (Heating)

- **Activity Description:**

Heating/cooling for the GBTS facility addition would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:

GBTS Facility Addition – 16,000 SF.

- **Activity Start Date**

Start Month: 1

Start Year: 2033

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.002397
SO _x	0.000261
NO _x	0.043581
CO	0.036608

Pollutant	Emissions Per Year (TONs)
PM 10	0.003312
PM 2.5	0.003312
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000985
N ₂ O	0.000985

Pollutant	Emissions Per Year (TONs)
CO ₂	52.305423
CO ₂ e	52.594008

3.2 Heating Assumptions

- **Heating**

Heating Calculation Type: Heat Energy Requirement Method

- **Heat Energy Requirement Method**

Area of floorspace to be heated (ft²): 16,000

Type of fuel: Natural Gas

Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

Heat Value (MMBtu/ft³): 0.00105

Energy Intensity (MMBtu/ft²): 0.0572

- **Default Settings Used:** Yes

- **Boiler/Furnace Usage**

Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- **Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)**

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- **Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)**

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

3.4 Heating Formula(s)

- **Heating Fuel Consumption ft³ per Year**

FC_{HER} = HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Maintenance Hangar/Unit Maintenance Training (UMT) Facility

- Activity Description:

Construction of the UMT facility (46,500 SF) would occur over a 2-year period from January 2031 through December 2032. An approximately 15,000 SF parking area would also be constructed.

Site grading would occur on the site for new construction and pavements (approx. 61,500 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for site utilities would require approximately 500 feet of excavation. A 3-foot trench width for utilities was assumed, for a total of 1,500 SF. Trenching would begin in March 2032 and last approximately 2 months.

Construction would include the 46,500-SF UMT facility. The height of construction was assumed to be 30 feet. Construction would begin in May 2031 and last approximately 16 months.

Architectural coatings would be applied to the facility, totaling 46,500 SF. Architectural coating application would begin in September 2032 and last approximately 2 months.

Paving for the parking area would occur on an area totaling approximately 15,000 SF. Paving would begin November 2032 and last approximately 2 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.759672
SO _x	0.004743
NO _x	1.757835
CO	2.698828

Pollutant	Total Emissions (TONs)
PM 10	1.305911
PM 2.5	0.045534
Pb	0.000000
NH ₃	0.005541

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.018675
N ₂ O	0.008118

Pollutant	Total Emissions (TONs)
CO ₂	482.352228
CO ₂ e	485.026336

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 61,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO_{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 16
 Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 46,500
 Height of Building (ft): 30
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 2
 Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 46,500
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 1: Conversion Factor man days to trips (1 trip / 1 man * day)
 WT: Average Worker Round Trip Commute (mile)
 PA: Paint Area (ft²)
 800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
 BA: Area of Building (ft²)
 2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)
 0.0116: Emission Factor (lb/ft²)
 2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 11
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 2
 Number of Days: 0

4.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 15,000

- Paving Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)

2.62: Emission Factor (lb/acre)

PA: Paving Area (ft²)

43560: Conversion Factor square feet to acre (43,560 ft² / acre)² / acre)

2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: UMT Facility (Heating)

- Activity Description:

Heating/cooling for the UMT facility would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:

UMT Facility – 46,500 SF.

- Activity Start Date

Start Month: 1

Start Year: 2033

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.007892
SO _x	0.000861
NO _x	0.143486
CO	0.120528

Pollutant	Emissions Per Year (TONs)
PM 10	0.010905
PM 2.5	0.010905
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003243
N ₂ O	0.003243

Pollutant	Emissions Per Year (TONs)
CO ₂	172.210119
CO ₂ e	173.160253

5.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 46,500

Type of fuel: Natural Gas

Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

Heat Value (MMBtu/ft³): 0.00105

Energy Intensity (MMBtu/ft²): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

5.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1,000,000 scf)

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

5.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1,000,000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ramp Expansion

- Activity Description:

Ramp expansion would include grading and paving new ramp areas. Activities would occur over a 2-year period starting in January 2031.

Site grading would occur on the entire area (approx. 60,000 SF). Site grading would begin in January 2031 and last approximately 12 months.

Paving would occur on approximately 60,000 SF. Paving would begin January 2032 and last approximately 12 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.223808
SO _x	0.004137
NO _x	1.747959
CO	2.696316

Pollutant	Total Emissions (TONs)
PM 10	7.235707
PM 2.5	0.066310
Pb	0.000000
NH ₃	0.003490

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.017588
N ₂ O	0.003891

Pollutant	Total Emissions (TONs)
CO ₂	439.110329
CO ₂ e	440.634041

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 12
Number of Days: 0

6.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 60,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

6.2 Paving Phase

6.2.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 12

Number of Days: 0

6.2.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 60,000

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55245	0.00854	4.19397	3.25427	0.16245	0.14946
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.18992	0.00486	2.01767	3.42447	0.07875	0.07245
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15717	0.00487	1.70774	3.37751	0.04850	0.04462
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.42190	0.00542	3.41206	4.00506	0.10233	0.09414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.10601	572.06247
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

6.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)

2.62: Emission Factor (lb/acre)

PA: Paving Area (ft²)

43560: Conversion Factor square feet to acre (43,560 ft² / acre)² / acre)

2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Hush House Pad

- Activity Description:

Construction of the hush house pad (27,500 SF) would occur over a 2-year period from January 2031 through December 2032.

Site grading would occur on the entire site (27,500 SF). Site grading would begin in January 2031 and last approximately 4 months.

Trenching for the reinforced concrete and utilities would occur over the entire site (27,500 SF). It was assumed excavated fill would be reused in place. Trenching would begin in May 2031 and last approximately 4 months.

Construction of the new hush house pad would total approximately 27,500 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in September 2031 and last approximately 16 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 0

End Month: 2033

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.191392
SO _x	0.003579
NO _x	1.526256
CO	2.354629

Pollutant	Total Emissions (TONs)
PM 10	2.239433
PM 2.5	0.045659
Pb	0.000000
NH ₃	0.003939

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.014222
N ₂ O	0.003307

Pollutant	Total Emissions (TONs)
CO ₂	356.767753
CO ₂ e	358.042202

7.1 Site Grading Phase

7.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 4
Number of Days: 0

7.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 27,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

7.2 Trenching/Excavating Phase

7.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 5

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 4

Number of Days: 0

7.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 27,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

7.3 Building Construction Phase

7.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 9

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 16

Number of Days: 0

7.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 27,500

Height of Building (ft): 2

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No

Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Concrete/Industrial Saws Composite	1	8
Generator Sets Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	0
Plate Compactors Composite	1	8
Rollers Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153

Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

7.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: T-7A Shelters

- Activity Description:

Construction of 131 aircraft shelters (sunshades) would occur over a 2-year period from January 2031 through December 2032.

Demolition would be required for the existing T-38C shelters. Demolition would include removal of 131 sunshades totaling approximately 295,000 SF. Demolition would begin in January 2031 and last approximately 12 months.

Construction would include installation of 131 T-7A sunshades totaling approximately 295,000 SF. The height of all sunshades were assumed to be 15 feet. Construction would begin in January 2032 and last approximately 12 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.198054
SO _x	0.004904
NO _x	1.712015
CO	2.783569

Pollutant	Total Emissions (TONs)
PM 10	0.985626
PM 2.5	0.042658
Pb	0.000000
NH ₃	0.011951

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.020365
N ₂ O	0.024701

Pollutant	Total Emissions (TONs)
CO ₂	588.598180
CO ₂ e	595.714083

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 12
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²): 295,000
Height of Building to be demolished (ft): 15

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

8.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (0.00042 * BA * BH) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

0.00042: Emission Factor (lb/ft³)

BA: Area of Building to be demolished (ft²)

BH: Height of Building to be demolished (ft)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building being demolish (ft²)

BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

8.2 Building Construction Phase

8.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2032

- Phase Duration

Number of Month: 12

Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 295,000

Height of Building (ft): 15

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	2	7
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.16757	0.00487	1.25709	1.55759	0.05276	0.04854
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19055	0.00487	1.77383	3.55935	0.05272	0.04850
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.53211	0.00793	4.25580	2.83928	0.16416	0.15103
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15988	0.00489	1.61021	3.49533	0.03433	0.03158
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.34949	0.00735	3.21107	4.36083	0.03339	0.03072

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]			
	CH₄	N₂O	CO₂
Emission Factors	0.02140	0.00428	527.61055
Forklifts Composite [HP: 82] [LF: 0.2]			
	CH₄	N₂O	CO₂
Emission Factors	0.02138	0.00428	527.07594
Generator Sets Composite [HP: 14] [LF: 0.74]			
	CH₄	N₂O	CO₂
Emission Factors	0.02305	0.00461	568.30495

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.30587	570.25615

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

8.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Addition to Egress Shop

- Activity Description:

Construction of the addition to the egress shop would occur over a 2-year period from January 2031 through December 2032.

Site grading would occur on the site of the addition, 3,400 SF. Site grading would begin in January 2031 and last approximately 1 month.

Construction of the egress shop addition would total approximately 3,400 SF. The height of the addition was assumed to be 20 feet. Construction would begin in February 2031 and last approximately 22 months.

Architectural coatings would be applied to the addition, totaling 3,400 SF. Architectural coating application would begin in December 2032 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2032

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.143878
SO _x	0.002583
NO _x	0.805008
CO	1.473874

Pollutant	Total Emissions (TONs)
PM 10	0.063196
PM 2.5	0.026319
Pb	0.000000
NH ₃	0.002309

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.011335
N ₂ O	0.002639

Pollutant	Total Emissions (TONs)
CO ₂	283.411958
CO ₂ e	284.428557

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,400
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

9.2 Building Construction Phase

9.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 2

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 22

Number of Days: 0

9.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 3,400
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

9.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]			
	CH₄	N₂O	CO₂
Emission Factors	0.02140	0.00428	527.61055
	CO_{2e}		
			529.42117
Forklifts Composite [HP: 82] [LF: 0.2]			
	CH₄	N₂O	CO₂
Emission Factors	0.02138	0.00428	527.07594
	CO_{2e}		
			528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]			
	CH₄	N₂O	CO₂
Emission Factors	0.02147	0.00429	529.26401
	CO_{2e}		
			531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 BA : Area of Building (ft²)
 BH : Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
 HT : Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

9.3 Architectural Coatings Phase

9.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
 Start Quarter: 1
 Start Year: 2032

- Phase Duration

Number of Month: 1
 Number of Days: 0

9.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 3,400
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

9.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

10. Heating

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Addition to Egress Shop (Heating)

- **Activity Description:**

Heating/cooling for the new addition would begin following the construction period, or approximately January 2033. Heating/cooling would be required as follows:

Addition to the Egress Shop – 3,400 SF.

- **Activity Start Date**

Start Month: 1

Start Year: 2033

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000845
SO _x	0.000092
NO _x	0.015365
CO	0.012906

Pollutant	Emissions Per Year (TONs)
PM 10	0.001168
PM 2.5	0.001168
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000347
N ₂ O	0.000347

Pollutant	Emissions Per Year (TONs)
CO ₂	18.440634
CO ₂ e	18.542376

10.2 Heating Assumptions

- **Heating**

Heating Calculation Type: Heat Energy Requirement Method

- **Heat Energy Requirement Method**

Area of floorspace to be heated (ft²): 3,400

Type of fuel: Natural Gas

Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

Heat Value (MMBtu/ft³): 0.00105

Energy Intensity (MMBtu/ft²): 0.0949

- **Default Settings Used:** Yes

- **Boiler/Furnace Usage**

Operating Time Per Year (hours): 900 (default)

10.3 Heating Emission Factor(s)

- **Heating Criteria Pollutant Emission Factors (lb/1,000,000 scf)**

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃
5.5	0.6	100	84	7.6	7.6		

- **Heating Greenhouse Gasses Pollutant Emission Factors (lb/1000000 scf)**

CH ₄	N ₂ O	CO ₂	CO ₂ e
2.26	2.26	120019	120143

10.4 Heating Formula(s)

- **Heating Fuel Consumption ft³ per Year**

FC_{HER} = HA * EI / HV / 1,000,000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Jet Blast Deflectors

- Activity Description:

Construction of the jet blast deflectors would occur over a 2-year period from January 2031 through December 2032.

Construction of the deflectors would total approximately 2,000 SF. The height of the deflectors was assumed to be 12 feet. Construction would begin in January 2031 and last approximately 24 months.

- Activity Start Date

Start Month: 1

Start Year: 2031

- Activity End Date

Indefinite: False

End Month: 1

End Year: 2033

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.101013
SO _x	0.002586
NO _x	0.774680
CO	1.461830

Pollutant	Total Emissions (TONs)
PM 10	0.027217
PM 2.5	0.024360
Pb	0.000000
NH ₃	0.002352

- Global Scale Activity Emissions of Greenhouse Gases:

Pollutant	Total Emissions (TONs)
CH ₄	0.011342
N ₂ O	0.002520

Pollutant	Total Emissions (TONs)
CO ₂	283.219970
CO ₂ e	284.205261

11.1 Building Construction Phase

11.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 24

Number of Days: 0

11.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 2,000
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

11.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Airfield Improvements

- Activity Description:

Airfield improvements would include airfield markings, installation of mooring and anchor rods, replacing the aircraft arresting system, and removing aboveground service modules of the Centralized Aircraft Support System (CASS). Activities would occur over a 1-year period starting in January 2031 (painting activities would occur from September through December 2031 and are captured in a separate Paint Booth activity).

Trenching/excavation for the mooring and anchor rods was estimated to occur on 100 SF. Excavation for replacing the arresting system may be required (approx. 1,000 SF). Total excavation was estimated at 1,100 SF. Excavation would begin in January 2031 and last approximately 2 months. Assumed no materials are required to be hauled on- or off-site; excavated spoils will be used on-site.

The construction activity was used to characterize removal of existing airfield markings. Grinders would likely be used to remove existing paint, estimated at 50,000 SF. Paint removal would begin in March 2031 and last approximately 5 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 7
End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.033345
SO _x	0.000641
NO _x	0.279630
CO	0.393083

Pollutant	Total Emissions (TONs)
PM 10	0.027621
PM 2.5	0.005028
Pb	0.000000
NH ₃	0.000738

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.002210
N ₂ O	0.000640

Pollutant	Total Emissions (TONs)
CO ₂	56.045595
CO ₂ e	56.277179

12.1 Trenching/Excavating Phase

12.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

12.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1,100
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318

Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

12.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Workdays (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

12.2 Building Construction Phase

12.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 5
 Number of Days: 0

12.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 50,000
 Height of Building (ft): 1
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	2	8
Generator Sets Composite	1	8
Pressure Washers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

12.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Pressure Washers Composite [HP: 14] [LF: 0.3]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.51763	0.00858	4.27809	3.23942	0.16821	0.15476

- Construction Exhaust Greenhouse Gases Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pressure Washers Composite [HP: 14] [LF: 0.3]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02346	0.00469	578.39247	580.37736

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

12.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

13. Paint Booth

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Airfield Improvements (Painting)

- Activity Description:

Painting activities would be a continuation of the airfield improvements construction activity. Painting was estimated at 150 gallons. Asphalt/Concrete Paint would be used (TT-P-1952E Type III used as surrogate to estimate for VOC content). Painting would begin in August 2031 and last approximately 5 months.

- Activity Start Date

Start Month: 8

Start Year: 2031

- Activity End Date

Indefinite: No

End Month: 12

End Year: 2031

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.011873
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.000000
N ₂ O	0.000000

Pollutant	Total Emissions (TONs)
CO ₂	0.000000
CO ₂ e	0.000000

13.2 Paint Booth Assumptions

- Paint Booth

Coating throughput (gallons/year): 150

- Default Settings Used: No

- Paint Booth Consumption

Coating used: Asphalt/Concrete Paint (TT-P-1952E Type III used as surrogate)
Specific gravity of coating: 1.4
Coating VOC content by weight (%): 6.5
Efficiency of control device (%): 50

13.3 Paint Booth Formula(s)

- Paint Booth Emissions per Year

$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$
PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)
VOC: Coating VOC content by weight (%)
(VOC / 100): Conversion Factor percent to decimal
CT: Coating throughput (gallons/year)
SG: Specific gravity of coating
8.35: Conversion Factor the density of water
CD: Efficiency of control device (%)
(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
2000: Conversion Factor pounds to tons

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Renovate Squad Operations 1

- Activity Description:

Renovations would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 165,000 SF) would be construction to equate the renovations (165,000 SF * 0.25 = 41,250 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (165,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	2.036021
SO _x	0.002744
NO _x	0.982507
CO	1.500633

Pollutant	Total Emissions (TONs)
PM 10	0.027778
PM 2.5	0.023494
Pb	0.000000
NH ₃	0.003633

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.010656
N ₂ O	0.005897

Pollutant	Total Emissions (TONs)
CO ₂	280.268179
CO ₂ e	282.129405

14.1 Building Construction Phase

14.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 11
Number of Days: 0

14.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 41,250
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

14.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278

Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

14.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

14.2 Architectural Coatings Phase

14.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 1

Number of Days: 0

14.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 165,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

14.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

15. Construction / Demolition

15.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Renovate Squad Operations 2

- Activity Description:

Renovations would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 100,000 SF) would be construction to equate the renovations (100,000 SF * 0.25 = 25,000 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (100,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.281448
SO _x	0.002710
NO _x	0.968997
CO	1.488778

Pollutant	Total Emissions (TONs)
PM 10	0.026657
PM 2.5	0.023040
Pb	0.000000
NH ₃	0.003041

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.010474
N ₂ O	0.004443

Pollutant	Total Emissions (TONs)
CO ₂	270.068383
CO ₂ e	271.539060

15.1 Building Construction Phase

15.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 11

Number of Days: 0

15.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 25,000
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

15.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

15.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

15.2 Architectural Coatings Phase

15.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

15.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 100,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

15.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

15.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (BA * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

16. Construction / Demolition

16.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Hangar Renovation

- Activity Description:

Modification of either Building 2404, 2406, 2408, or 2410 would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the hangar (approx. 40,000 SF) would be construction to equate the renovations (40,000 SF * 0.25 = 10,000 SF). The height of the hangar was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 11 months.

It was assumed architectural coatings would be required for the entire facility (40,000 SF) following the renovations. Architectural coating application would begin in December 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.575177
SO _x	0.002406
NO _x	0.881174
CO	1.389029

Pollutant	Total Emissions (TONs)
PM 10	0.022338
PM 2.5	0.019599
Pb	0.000000
NH ₃	0.002494

- Global Scale Activity Emissions of Greenhouse Gases:

Pollutant	Total Emissions (TONs)
CH ₄	0.009110
N ₂ O	0.002861

Pollutant	Total Emissions (TONs)
CO ₂	231.143070
CO ₂ e	232.156290

16.1 Building Construction Phase

16.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 11

Number of Days: 0

16.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 10,000

Height of Building (ft): 30

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

16.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.35922	0.00735	3.23985	4.37186	0.03892	0.03580

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473

Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.30593	570.25621
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02147	0.00429	529.26401	531.08031
Welders Composite [HP: 46] [LF: 0.45]				
	CH ₄	N ₂ O	CO ₂	CO _{2e}
Emission Factors	0.02305	0.00461	568.30362	570.25389

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

16.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

16.2 Architectural Coatings Phase

16.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

16.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 40,000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

16.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Remove Aboveground Service Modules of the CASS

- **Activity Description:**

Removal of T-38C CASS modules would occur over a 1-year period starting in January 2031.

It was assumed approximately 1,000 SF would be excavated and filled for CASS removal. Excavation would begin in January 2031 and last approximately 12 months. Assumed no materials are required to be hauled on- or off-site; excavated spoils will be used on-site.

- **Activity Start Date**

Start Month: 1
Start Month: 2031

- **Activity End Date**

Indefinite: False
End Month: 12
End Month: 2031

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.047432
SO _x	0.000912
NO _x	0.417206
CO	0.720250

Pollutant	Total Emissions (TONs)
PM 10	0.127785
PM 2.5	0.007411
Pb	0.000000
NH ₃	0.001162

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH ₄	0.003996
N ₂ O	0.000890

Pollutant	Total Emissions (TONs)
CO ₂	100.176741
CO ₂ e	100.524406

17.1 Trenching/Excavating Phase

17.1.1 Trenching / Excavating Phase Timeline Assumptions

- **Phase Start Date**

Start Month: 1
Start Quarter: 1
Start Year: 2031

- **Phase Duration**

Number of Month: 12
Number of Days: 0

17.1.2 Trenching / Excavating Phase Assumptions

- **General Trenching/Excavating Information**

Area of Site to be Trenched/Excavated (ft²): 1,000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- **Trenching Default Settings**

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- **Construction Exhaust (default)**

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- **Vehicle Exhaust**

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

17.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Workdays (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Workdays (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Compass Rose & Trim Pad

- Activity Description:

Repairs and preparation of existing aircraft pavement for a compass rose and trim pad would occur over a 1-year period starting in January 2031 (compass rose painting activities would occur from November through December 2031 and are captured in a separate Paint Booth activity).

Site grading would occur on the site for the compass rose/trim pad and access road (approx. 30,000 SF). Site grading would begin in January 2031 and last approximately 3 months.

Excavation would occur over the entire site (30,000 SF). It was assumed excavated fill would be reused in place. Trenching would begin in April 2031 and last approximately 3 months.

Construction of the compass rose and trim pad would total approximately 15,000 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in July 2031 and last approximately 3 months.

Paving for the access road would occur on approximately 15,000 SF. Paving would begin in October 2031 and last approximately 1 month.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.068650
SO _x	0.001254
NO _x	0.553532
CO	0.812319

Pollutant	Total Emissions (TONs)
PM 10	1.809833
PM 2.5	0.017326
Pb	0.000000
NH ₃	0.001088

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005099
N ₂ O	0.001213

Pollutant	Total Emissions (TONs)
CO ₂	127.632549
CO ₂ e	128.096865

18.1 Site Grading Phase

18.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 3

Number of Days: 0

18.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 30,000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]			
	CH ₄	N ₂ O	CO ₂
Emission Factors	0.02154	0.00431	531.04687
Other Construction Equipment Composite [HP: 82] [LF: 0.42]			
	CH ₄	N ₂ O	CO ₂
Emission Factors	0.02137	0.00427	526.88032
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]			
	CH ₄	N ₂ O	CO ₂
Emission Factors	0.02160	0.00432	532.38223

Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Workdays (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

18.2 Trenching/Excavating Phase

18.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 4
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 3
 Number of Days: 0

18.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 30,000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Workdays (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Workdays (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18.3 Building Construction Phase

18.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 3
Number of Days: 0

18.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 15,000
Height of Building (ft): 2
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	2	8
Generator Sets Composite	1	8
Pressure Washers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

18.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.33196	0.00741	3.22099	4.22718	0.03631	0.03341
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.53249	0.00793	4.25997	2.83929	0.16510	0.15189

Pressure Washers Composite [HP: 14] [LF: 0.3]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.51763	0.00858	4.27809	3.23942	0.16821	0.15476

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02325	0.00465	573.26828	575.23559
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.30593	570.25621
Pressure Washers Composite [HP: 14] [LF: 0.3]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02346	0.00469	578.39247	580.37736

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18.4 Paving Phase

18.4.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 1
Number of Days: 0

18.4.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 15,000

- Paving Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

18.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560 / 2000$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43,560 ft² / acre)
2000: Conversion Factor square pounds to TONs (2,000 lb / TON)

19. Paint Booth

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Compass Rose & Trim Pad (Painting)

- Activity Description:

Painting activities would be a continuation of the compass rose & trim pad construction activity. Painting was estimated at 150 gallons. Asphalt/Concrete Paint would be used (TT-P-1952E Type III used as surrogate to estimate for VOC content). Painting would begin in November 2031 and last approximately 2 months.

- Activity Start Date

Start Month: 11
Start Year: 2031

- Activity End Date

Indefinite: No
End Month: 12
End Year: 2031

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.004749
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.000000
N ₂ O	0.000000

Pollutant	Total Emissions (TONs)
CO ₂	0.000000
CO ₂ e	0.000000

19.2 Paint Booth Assumptions

- Paint Booth

Coating throughput (gallons/year): 150

- Default Settings Used: No

- Paint Booth Consumption

Coating used: Asphalt/Concrete Paint (TT-P-1952E Type III used as surrogate)
 Specific gravity of coating: 1.4
 Coating VOC content by weight (%): 6.5
 Efficiency of control device (%): 50

19.3 Paint Booth Formula(s)

- Paint Booth Emissions per Year

$$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$$

PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)

VOC: Coating VOC content by weight (%)

(VOC / 100): Conversion Factor percent to decimal

CT: Coating throughput (gallons/year)

SG: Specific gravity of coating

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Munitions Storage for T-7A

- Activity Description:

Construction of the concrete pad for munitions storage would occur over a 1-year period starting in January 2031.

Site grading would occur on the entire site (3,600 SF). Site grading would begin in January 2031 and last approximately 2 months.

Trenching for the concrete pad would occur over the entire site (3,600 SF). It was assumed excavated fill would be reused in place. Trenching would begin in March 2031 and last approximately 2 months.

Construction of the pad would total approximately 3,600 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in May 2031 and last approximately 8 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.071809
SO _x	0.001359
NO _x	0.582613
CO	0.932667

Pollutant	Total Emissions (TONs)
PM 10	0.165142
PM 2.5	0.019739
Pb	0.000000
NH ₃	0.001377

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005755
N ₂ O	0.001309

Pollutant	Total Emissions (TONs)
CO ₂	144.008411
CO ₂ e	144.516483

20.1 Site Grading Phase

20.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

20.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,600
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

20.2 Trenching/Excavating Phase

20.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3

Start Quarter: 1

Start Year: 2031

- Phase Duration

Number of Month: 2

Number of Days: 0

20.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 3,600
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

20.3 Building Construction Phase

20.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 8
Number of Days: 0

20.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 3,600
Height of Building (ft): 5
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	8
Plate Compactors Composite	1	8
Rollers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

20.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02382	0.00476	587.11055	589.12536

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

20.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

21. Construction / Demolition

21.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Hammerhead Expansion

- Activity Description:

Construction for the hammerhead expansion would occur over a 1-year period starting in January 2031.

Site grading would occur on the entire site (3,500 SF). Site grading would begin in January 2031 and last approximately 2 months.

Excavation would occur over the entire site (3,500 SF). It was assumed excavated fill would be reused in place. Trenching would begin in March 2031 and last approximately 2 months.

Construction of the hammerhead expansion would total approximately 3,500 SF. Construction would include concrete mixers, rollers, and similar equipment. Construction would begin in May 2031 and last approximately 8 months.

- Activity Start Date

Start Month: 1

Start Month: 2031

- Activity End Date

Indefinite: False

End Month: 12

End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.071809
SO _x	0.001359
NO _x	0.582599
CO	0.932655

Pollutant	Total Emissions (TONs)
PM 10	0.161162
PM 2.5	0.019739
Pb	0.000000
NH ₃	0.001376

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005755
N ₂ O	0.001308

Pollutant	Total Emissions (TONs)
CO ₂	143.997949
CO ₂ e	144.505622

21.1 Site Grading Phase

21.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

21.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.24983	0.00490	1.68099	3.41141	0.09568	0.08803
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.21522	0.00487	2.15545	3.47633	0.09705	0.08928
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.32342	0.00491	2.66538	2.60458	0.12405	0.11412
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02154	0.00431	531.04687	532.86928
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02137	0.00427	526.88032	528.68844
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02160	0.00432	532.38223	534.20923
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

21.2 Trenching/Excavating Phase

21.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 2
Number of Days: 0

21.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 3,500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.30767	0.00543	3.28327	4.16592	0.05781	0.05318
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.36454	0.00543	3.36875	4.50643	0.05884	0.05414
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02385	0.00477	588.06593	590.08402
Other General Industrial Equipment Composite [HP: 35] [LF: 0.34]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02384	0.00477	587.81454	589.83177
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO _{2e}
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Workdays (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

21.3 Building Construction Phase

21.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2031

- Phase Duration

Number of Month: 8
 Number of Days: 0

21.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 3,500
 Height of Building (ft): 5
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	8
Pavers Composite	1	8
Paving Equipment Composite	1	8
Plate Compactors Composite	1	8
Rollers Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

21.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.55254	0.00855	4.19473	3.25479	0.16253	0.14953
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19401	0.00486	2.08707	3.42646	0.08314	0.07648
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.15932	0.00487	1.73380	3.38321	0.04997	0.04598
Plate Compactors Composite [HP: 8] [LF: 0.43]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.54671	0.00884	4.14272	3.46996	0.16188	0.14893
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.44496	0.00542	3.44295	4.03665	0.11101	0.10213

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02313	0.00463	570.19781	572.15458
Pavers Composite [HP: 81] [LF: 0.42]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02133	0.00427	525.84622	527.65079
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02140	0.00428	527.61090	529.42153
Plate Compactors Composite [HP: 8] [LF: 0.43]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02305	0.00461	568.29423	570.24447
Rollers Composite [HP: 36] [LF: 0.38]				
	CH₄	N₂O	CO₂	CO₂e
Emission Factors	0.02382	0.00476	587.11055	589.12536

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH₄	N₂O	CO₂	CO₂e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

21.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

22. Construction / Demolition

22.1 General Information & Timeline Assumptions

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Support Mechanized Material Handling System (in T-7A parts Warehouse)

- Activity Description:

Renovations for interior electrical support would occur over a 1-year period starting in January 2031.

It was assumed 25 percent of the total square footage of the building (approx. 10,000 SF) would be construction to equate the renovations (10,000 SF * 0.25 = 2,500 SF). The height of the buildings was assumed to be 30 feet. Renovations would begin in January 2031 and last approximately 12 months.

- Activity Start Date

Start Month: 1
Start Month: 2031

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2031

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.050581
SO _x	0.001297
NO _x	0.389086
CO	0.732447

Pollutant	Total Emissions (TONs)
PM 10	0.013753
PM 2.5	0.012239
Pb	0.000000
NH ₃	0.001253

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.005695
N ₂ O	0.001448

Pollutant	Total Emissions (TONs)
CO ₂	142.928113
CO ₂ e	143.471229

22.1 Building Construction Phase

22.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2031

- Phase Duration

Number of Month: 12
Number of Days: 0

22.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 2,500
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

22.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.17419	0.00487	1.34722	1.58777	0.05874	0.05404
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.19598	0.00487	1.83160	3.56245	0.05737	0.05278
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Emission Factors	0.16247	0.00489	1.63682	3.49664	0.03656	0.03363

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02140	0.00428	527.61055	529.42117
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02138	0.00428	527.07594	528.88473
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH ₄	N ₂ O	CO ₂	CO ₂ e
Emission Factors	0.02147	0.00429	529.26401	531.08031

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25685	0.00224	0.07536	3.18708	0.01935	0.00660	0.04414
LDGT	0.20366	0.00297	0.10721	2.86080	0.02047	0.00734	0.03690
HDGV	0.56373	0.00661	0.34441	6.67526	0.04270	0.02019	0.08172
LDDV	0.09903	0.00124	0.15591	7.22209	0.02244	0.00823	0.01671
LDDT	0.08775	0.00120	0.15821	2.61242	0.02012	0.00731	0.01546
HDDV	0.06662	0.00397	1.57106	1.37852	0.13026	0.05281	0.06887
MC	2.57330	0.00304	0.60648	11.25596	0.03094	0.02161	0.05606

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01089	0.00449	285.08077	286.57459
LDGT	0.01136	0.00629	378.96017	380.94613
HDGV	0.03450	0.02086	841.51932	848.01374
LDDV	0.04907	0.00067	369.86331	371.41539
LDDT	0.02422	0.00098	359.27208	360.21036
HDDV	0.02114	0.16914	1186.09183	1231.50702
MC	0.10118	0.00284	394.03643	397.62186

22.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Workdays (days)

H: Hours Worked per Day (hours)

HP: Equipment Horsepower

LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)

0.002205: Conversion Factor grams to pounds

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1,000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Vendor Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 BA : Area of Building (ft²)
 BH : Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1,000 ft³)
 HT : Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vendor Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

23. Personnel

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Transitional Increase of 100 Personnel

- Activity Description:

Increase of 100 personnel during the T-7A and T-38C transition period (i.e., 2033 through 2036). Assumed all personnel commute daily.

- Activity Start Date

Start Month: 1
Start Year: 2033

- Activity End Date

Indefinite: No
End Month: 12
End Year: 2036

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.607366
SO _x	0.005903
NO _x	0.211956
CO	6.723078

Pollutant	Total Emissions (TONs)
PM 10	0.045211
PM 2.5	0.016428
Pb	0.000000
NH ₃	0.088579

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH ₄	0.027749
N ₂ O	0.012380

Pollutant	Total Emissions (TONs)
CO ₂	753.334934
CO ₂ e	757.394193

23.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel:	100
Civilian Personnel:	0
Support Contractor Personnel:	0
Air National Guard (ANG) Personnel:	0
Reserve Personnel:	0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel:	5 Days Per Week (default)
Civilian Personnel:	5 Days Per Week (default)
Support Contractor Personnel:	5 Days Per Week (default)
Air National Guard (ANG) Personnel:	4 Days Per Week (default)
Reserve Personnel:	4 Days Per Month (default)

23.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

23.4 Personnel Emission Factor(s)

- On Road Vehicle Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	NH ₃
LDGV	0.25418	0.00210	0.06585	2.90895	0.01876	0.00647	0.04233
LDGT	0.20052	0.00286	0.09270	2.68756	0.01996	0.00714	0.03585
HDGV	0.52890	0.00655	0.29513	6.07732	0.04127	0.01931	0.08206
LDDV	0.09228	0.00124	0.14059	7.44001	0.02278	0.00874	0.01684
LDDT	0.07431	0.00115	0.12481	2.41221	0.01970	0.00705	0.01527
HDDV	0.05762	0.00390	1.37962	1.33933	0.12436	0.04792	0.06921
MC	2.54108	0.00304	0.60490	11.11798	0.03078	0.02161	0.05640

- On Road Vehicle Greenhouse Gasses Emission Factors (grams/mile)

	CH ₄	N ₂ O	CO ₂	CO ₂ e
LDGV	0.01002	0.00438	267.46963	268.91076
LDGT	0.01058	0.00613	364.36705	366.28905
HDGV	0.03206	0.02033	834.70184	840.98717
LDDV	0.04934	0.00067	368.02625	369.58553
LDDT	0.02373	0.00098	344.66551	345.59058
HDDV	0.02092	0.16975	1164.86428	1210.43459
MC	0.09969	0.00284	394.07263	397.61557

23.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Workdays per Year

$$VMT_P = NP * WD * AC$$

VMT_P: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Workdays per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Add T-7As and LTOs

- Activity Description:

In 2034, add 28 T-7As and 2,646 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 953 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	20.537982
SO _x	1.590575
NO _x	19.785336
CO	65.957790

Pollutant	Emissions Per Year (TONs)
PM 10	1.215401
PM 2.5	1.111898
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.188406
N ₂ O	0.036142

Pollutant	Emissions Per Year (TONs)
CO ₂	4651.541883
CO ₂ e	4666.394913

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	19.059971
SO _x	1.213310
NO _x	13.431044
CO	39.652896

Pollutant	Emissions Per Year (TONs)
PM 10	0.288689
PM 2.5	0.255386
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.146472
N ₂ O	0.027931

Pollutant	Emissions Per Year (TONs)
CO ₂	3649.640288
CO ₂ e	3661.143321

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.162803
SO _x	0.290536
NO _x	3.943155
CO	25.784768

Pollutant	Emissions Per Year (TONs)
PM 10	0.574064
PM 2.5	0.515552
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.036575
N ₂ O	0.007136

Pollutant	Emissions Per Year (TONs)
CO ₂	869.825578
CO ₂ e	872.740655

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.315208
SO _x	0.086729
NO _x	2.411136
CO	0.520126

Pollutant	Emissions Per Year (TONs)
PM 10	0.352647
PM 2.5	0.340960
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005359
N ₂ O	0.001075

Pollutant	Emissions Per Year (TONs)
CO ₂	132.076016
CO ₂ e	132.510936

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	2,646
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	17.16
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.68
Takeoff [Afterburn] (mins):	0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

24.4 Auxiliary Power Unit (APU)

24.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

24.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO _{2e}
4501687C	211.0	0.0	0.0	740.4	740.7

24.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * EF_{\text{POL}} / 2000$$

APU_{POL} : Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
 EF_{POL} : Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

24.5 Aircraft Engine Test Cell

24.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 28

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	3
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

24.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

24.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

24.6 Aerospace Ground Equipment (AGE)

24.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 2646

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

24.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

24.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Add T-7A CPs

- Activity Description:

In 2034, add 10,121 T-7A CPs not included in LTOs.

953 CPs included in LTOs + 10,121 CPs not included in LTOs = 11,074 CPs in 2034.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	2.474996
SO _x	1.384387
NO _x	22.387582
CO	3.974190

Pollutant	Emissions Per Year (TONs)
PM 10	0.157380
PM 2.5	0.134757
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174278
N ₂ O	0.034002

Pollutant	Emissions Per Year (TONs)
CO ₂	4144.673850
CO ₂ e	4158.564039

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	2.474996
SO _x	1.384387
NO _x	22.387582
CO	3.974190

Pollutant	Emissions Per Year (TONs)
PM 10	0.157380
PM 2.5	0.134757
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174278
N ₂ O	0.034002

Pollutant	Emissions Per Year (TONs)
CO ₂	4144.673850
CO ₂ e	4158.564039

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: CP (Close Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 10,121
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 1.59
 Climb Out [Intermediate] (mins): 1.15
 Takeoff [Military] (mins): 0.34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Remove T-38C LTOs

- Activity Description:

In 2034, decrease T-38C LTOs by 2,315.

Includes 833 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-8.168078
SO _x	-0.726629
NO _x	-1.216621
CO	-91.273668

Pollutant	Emissions Per Year (TONs)
PM 10	-2.214141
PM 2.5	-1.991854
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.091474
N ₂ O	-0.017847

Pollutant	Emissions Per Year (TONs)
CO ₂	-2175.432134
CO ₂ e	-2182.722736

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-8.168078
SO _x	-0.726629
NO _x	-1.216621
CO	-91.273668

Pollutant	Emissions Per Year (TONs)
PM 10	-2.214141
PM 2.5	-1.991854
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.091474
N ₂ O	-0.017847

Pollutant	Emissions Per Year (TONs)
CO ₂	-2175.432134
CO ₂ e	-2182.722736

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	2,315
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	18.56
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.37
Takeoff [Afterburn] (mins):	0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

26.4 Auxiliary Power Unit (APU)

26.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

26.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

26.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034 Remove T-38C CPs

- Activity Description:

In 2034, decrease T-38C CPs by 8,857.

833 CPs included in LTOs + 8,857 CPs not included in LTOs = 9,690 CPs in 2034.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-1.856910
SO _x	-0.479348
NO _x	-0.472166
CO	-34.111898

Pollutant	Emissions Per Year (TONs)
PM 10	-0.830242
PM 2.5	-0.744970
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.060344
N ₂ O	-0.011773

Pollutant	Emissions Per Year (TONs)
CO ₂	-1435.104396
CO ₂ e	-1439.913912

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-1.856910
SO _x	-0.479348
NO _x	-0.472166
CO	-34.111898

Pollutant	Emissions Per Year (TONs)
PM 10	-0.830242
PM 2.5	-0.744970
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.060344
N ₂ O	-0.011773

Pollutant	Emissions Per Year (TONs)
CO ₂	-1435.104396
CO ₂ e	-1439.913912

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 8,857
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 1.59
Climb Out [Intermediate] (mins): 1.15
Takeoff [Military] (mins): 0.34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Add T-7As and LTOs

- Activity Description:

In 2035, add 48 T-7As and 10,144 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 3,652 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	75.446040
SO _x	5.020330
NO _x	60.132903
CO	196.891373

Pollutant	Emissions Per Year (TONs)
PM 10	3.390490
PM 2.5	3.125254
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.586654
N ₂ O	0.112095

Pollutant	Emissions Per Year (TONs)
CO ₂	14606.853611
CO ₂ e	14652.985052

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	72.244246
SO _x	4.189775
NO _x	44.129608
CO	150.694902

Pollutant	Emissions Per Year (TONs)
PM 10	1.054432
PM 2.5	0.934309
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.503408
N ₂ O	0.095741

Pollutant	Emissions Per Year (TONs)
CO ₂	12609.382738
CO ₂ e	12648.849547

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.993377
SO _x	0.498061
NO _x	6.759695
CO	44.202460

Pollutant	Emissions Per Year (TONs)
PM 10	0.984110
PM 2.5	0.883803
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.062700
N ₂ O	0.012233

Pollutant	Emissions Per Year (TONs)
CO ₂	1491.129563
CO ₂ e	1496.126838

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.208418
SO _x	0.332495
NO _x	9.243600
CO	1.994011

Pollutant	Emissions Per Year (TONs)
PM 10	1.351948
PM 2.5	1.307143
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.020546
N ₂ O	0.004121

Pollutant	Emissions Per Year (TONs)
CO ₂	506.341310
CO ₂ e	508.008668

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 48
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 10,144
Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 17.16
Approach [Approach] (mins): 5.18
Climb Out [Intermediate] (mins): 0.99
Takeoff [Military] (mins): 0.68
Takeoff [Afterburn] (mins): 0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 10
Intermediate (mins): 7.5
Military (mins): 2
Afterburn (mins): 0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28.4 Auxiliary Power Unit (APU)

28.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

28.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

28.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

28.5 Aircraft Engine Test Cell

28.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 48

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	3
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

28.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

28.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONS

- Aircraft Engine Test Cell Emissions per Year

TestCell = TestCellPS_{IDLE} + TestCellPS_{APPROACH} + TestCellPS_{INTERMEDIATE} + TestCellPS_{MILITARY} + TestCellPS_{AFTERBURN}

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

28.6 Aerospace Ground Equipment (AGE)

28.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 10,144

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

28.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

28.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Add T-7A CPs

- Activity Description:

In 2035, add 38,799 T-7A CPs not included in LTOs.

3,652 CPs included in LTOs + 38,799 CPs not included in LTOs = 42,451 CPs in 2035.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	9.487932
SO _x	5.307068
NO _x	85.823121
CO	15.235113

Pollutant	Emissions Per Year (TONs)
PM 10	0.603319
PM 2.5	0.516593
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668095
N ₂ O	0.130346

Pollutant	Emissions Per Year (TONs)
CO ₂	15888.667196
CO ₂ e	15941.915440

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	9.487932
SO _x	5.307068
NO _x	85.823121
CO	15.235113

Pollutant	Emissions Per Year (TONs)
PM 10	0.603319
PM 2.5	0.516593
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668095
N ₂ O	0.130346

Pollutant	Emissions Per Year (TONs)
CO ₂	15888.667196
CO ₂ e	15941.915440

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	48
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	38,799
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Remove T-38Cs and LTOs

- Activity Description:

By 2035, remove 28 T-38Cs and 11,577 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 4,168 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-42.956014
SO _x	-4.182744
NO _x	-17.069494
CO	-468.812745

Pollutant	Emissions Per Year (TONs)
PM 10	-12.816678
PM 2.5	-11.633533
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.502235
N ₂ O	-0.098115

Pollutant	Emissions Per Year (TONs)
CO ₂	-11964.389456
CO ₂ e	-12004.452393

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-41.181976
SO _x	-3.719406
NO _x	-6.166981
CO	-462.586571

Pollutant	Emissions Per Year (TONs)
PM 10	-11.221798
PM 2.5	-10.094858
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.468228
N ₂ O	-0.091351

Pollutant	Emissions Per Year (TONs)
CO ₂	-11135.414601
CO ₂ e	-11172.733104

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.394912
SO _x	-0.083873
NO _x	-0.353108
CO	-3.950478

Pollutant	Emissions Per Year (TONs)
PM 10	-0.051949
PM 2.5	-0.046878
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010559
N ₂ O	-0.002060

Pollutant	Emissions Per Year (TONs)
CO ₂	-251.104848
CO ₂ e	-251.946384

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-1.379126
SO _x	-0.379465
NO _x	-10.549404
CO	-2.275697

Pollutant	Emissions Per Year (TONs)
PM 10	-1.542932
PM 2.5	-1.491797
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.023449
N ₂ O	-0.004703

Pollutant	Emissions Per Year (TONs)
CO ₂	-577.870007
CO ₂ e	-579.772905

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	11,577
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	18.56
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.37
Takeoff [Afterburn] (mins):	0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)
 TD: Test Duration (min)
 60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1,000 pounds
 EF: Emission Factor (lb/1,000 lb fuel)
 NE: Number of Engines
 NA: Number of Aircraft
 NTT: Number of Trim Test
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)
 AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)
 AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
 AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

30.4 Auxiliary Power Unit (APU)

30.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

30.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

30.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
 APU: Number of Auxiliary Power Units
 OH: Operation Hours for Each LTO (hour)
 LTO: Number of LTOs
 EF_{POL}: Emission Factor for Pollutant (lb/hr)
 2000: Conversion Factor pounds to tons

30.5 Aircraft Engine Test Cell

30.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 56

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 2
Idle Duration (mins): 0
Approach Duration (mins): 0
Intermediate Duration (mins): 12
Military Duration (mins): 8
Afterburner Duration (mins): 7

30.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

30.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} + \text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

30.6 Aerospace Ground Equipment (AGE)

30.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 11,577

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

30.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

30.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035 Remove T-38C CPs

- Activity Description:

By 2035, remove 44,282 T-38C CPs not included in LTOs.

4,168 CPs included in LTOs + 44,282 not included in LTOs = 48,450 CPs in 2035.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-9.283920
SO _x	-2.396576
NO _x	-2.360669
CO	-170.547934

Pollutant	Emissions Per Year (TONs)
PM 10	-4.150931
PM 2.5	-3.724596
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.301700
N ₂ O	-0.058862

Pollutant	Emissions Per Year (TONs)
CO ₂	-7175.035890
CO ₂ e	-7199.081837

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-9.283920
SO _x	-2.396576
NO _x	-2.360669
CO	-170.547934

Pollutant	Emissions Per Year (TONs)
PM 10	-4.150931
PM 2.5	-3.724596
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.301700
N ₂ O	-0.058862

Pollutant	Emissions Per Year (TONs)
CO ₂	-7175.035890
CO ₂ e	-7199.081837

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	44,282
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Add T-7As and LTOs

- Activity Description:

In 2036, add 48 T-7As and 10,585 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

3,811 CPs included.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	78.610268
SO _x	5.200696
NO _x	62.194404
CO	203.482850

Pollutant	Emissions Per Year (TONs)
PM 10	3.493265
PM 2.5	3.221125
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.607388
N ₂ O	0.116038

Pollutant	Emissions Per Year (TONs)
CO ₂	15128.440055
CO ₂ e	15176.196866

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	75.355939
SO _x	4.355685
NO _x	45.789253
CO	157.199692

Pollutant	Emissions Per Year (TONs)
PM 10	1.098433
PM 2.5	0.973352
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.523249
N ₂ O	0.099505

Pollutant	Emissions Per Year (TONs)
CO ₂	13108.956512
CO ₂ e	13149.976205

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.993377
SO _x	0.498061
NO _x	6.759695
CO	44.202460

Pollutant	Emissions Per Year (TONs)
PM 10	0.984110
PM 2.5	0.883803
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.062700
N ₂ O	0.012233

Pollutant	Emissions Per Year (TONs)
CO ₂	1491.129563
CO ₂ e	1496.126838

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.260952
SO _x	0.346950
NO _x	9.645456
CO	2.080699

Pollutant	Emissions Per Year (TONs)
PM 10	1.410722
PM 2.5	1.363969
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.021439
N ₂ O	0.004300

Pollutant	Emissions Per Year (TONs)
CO ₂	528.353980
CO ₂ e	530.093824

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 48
 Flight Operation Cycle Type: LTO (Landing and Takeoff)
 Number of Annual Flight Operation Cycles for all Aircraft: 10,585
 Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 17.16
 Approach [Approach] (mins): 5.18
 Climb Out [Intermediate] (mins): 0.99
 Takeoff [Military] (mins): 0.68
 Takeoff [Afterburn] (mins): 0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

32.4 Auxiliary Power Unit (APU)

32.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

32.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

32.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$\text{APU}_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

32.5 Aircraft Engine Test Cell

32.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 48

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 3

Idle Duration (mins): 0

Approach Duration (mins): 0

Intermediate Duration (mins): 12

Military Duration (mins): 8

Afterburner Duration (mins): 7

32.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

32.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Total Number of Engines (For All Aircraft)
ARU: Annual Run-ups (Per Aircraft Engine)
2000: Conversion Factor pounds to TONS

- Aircraft Engine Test Cell Emissions per Year

TestCell = TestCellPS_{IDLE} + TestCellPS_{APPROACH} + TestCellPS_{INTERMEDIATE} + TestCellPS_{MILITARY} +
TestCellPS_{AFTERBURN}

TestCell: Aircraft Engine Test Cell Emissions (TONs)
TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)
TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)
TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)
TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)
TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

32.6 Aerospace Ground Equipment (AGE)

32.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 10,585

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

32.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

32.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Add T-7A CPs

- Activity Description:

In 2036, add 40,486 T-7A CPs not included in LTOs.

3,811 CPs included in LTOs + 40,486 CPs not included in LTOs = 44,297 CPs in 2036.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	9.900472
SO _x	5.537822
NO _x	89.554754
CO	15.897543

Pollutant	Emissions Per Year (TONs)
PM 10	0.629551
PM 2.5	0.539054
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.697145
N ₂ O	0.136013

Pollutant	Emissions Per Year (TONs)
CO ₂	16579.514423
CO ₂ e	16635.077927

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	9.900472
SO _x	5.537822
NO _x	89.554754
CO	15.897543

Pollutant	Emissions Per Year (TONs)
PM 10	0.629551
PM 2.5	0.539054
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.697145
N ₂ O	0.136013

Pollutant	Emissions Per Year (TONs)
CO ₂	16579.514423
CO ₂ e	16635.077927

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 48
Flight Operation Cycle Type: CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 40,486
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 1.59
Climb Out [Intermediate] (mins): 1.15
Takeoff [Military] (mins): 0.34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Remove T-38Cs and LTOs

- Activity Description:

By 2036, remove 56 T-38Cs and 11,852 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 4,267 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-44.688505
SO _x	-4.447580
NO _x	-17.900539
CO	-489.799099

Pollutant	Emissions Per Year (TONs)
PM 10	-13.317476
PM 2.5	-12.086327
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.534997
N ₂ O	-0.104509

Pollutant	Emissions Per Year (TONs)
CO ₂	-12744.016195
CO ₂ e	-12786.691121

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-42.486796
SO _x	-3.891356
NO _x	-6.394328
CO	-479.568390

Pollutant	Emissions Per Year (TONs)
PM 10	-11.633996
PM 2.5	-10.465338
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.489874
N ₂ O	-0.095575

Pollutant	Emissions Per Year (TONs)
CO ₂	-11650.209771
CO ₂ e	-11689.253525

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.789824
SO _x	-0.167746
NO _x	-0.706216
CO	-7.900955

Pollutant	Emissions Per Year (TONs)
PM 10	-0.103898
PM 2.5	-0.093755
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.021117
N ₂ O	-0.004120

Pollutant	Emissions Per Year (TONs)
CO ₂	-502.209696
CO ₂ e	-503.892769

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-1.411886
SO _x	-0.388479
NO _x	-10.799995
CO	-2.329753

Pollutant	Emissions Per Year (TONs)
PM 10	-1.579582
PM 2.5	-1.527233
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.024006
N ₂ O	-0.004815

Pollutant	Emissions Per Year (TONs)
CO ₂	-591.596728
CO ₂ e	-593.544828

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 11,852
Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 18.56
Approach [Approach] (mins): 5.18
Climb Out [Intermediate] (mins): 0.99
Takeoff [Military] (mins): 0.37
Takeoff [Afterburn] (mins): 0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 10
Intermediate (mins): 7.5
Military (mins): 2
Afterburn (mins): 0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1 000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

34.4 Auxiliary Power Unit (APU)

34.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

34.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

34.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$\text{APU}_{\text{POL}} = \text{APU} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

34.5 Aircraft Engine Test Cell

34.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 112

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 2

Idle Duration (mins): 0

Approach Duration (mins): 0

Intermediate Duration (mins): 12

Military Duration (mins): 8

Afterburner Duration (mins): 7

34.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

34.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

34.6 Aerospace Ground Equipment (AGE)

34.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 11852

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

34.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

34.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036 Remove T-38C CPs

- Activity Description:

By 2036, remove 45,336 T-38C CPs not included in LTOs.

4,267 CPs included in LTOs + 45,336 CPs not included in LTOs = 49,603 CPs in 2036.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-9.504896
SO _x	-2.453620
NO _x	-2.416858
CO	-174.607315

Pollutant	Emissions Per Year (TONs)
PM 10	-4.249731
PM 2.5	-3.813249
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.308881
N ₂ O	-0.060263

Pollutant	Emissions Per Year (TONs)
CO ₂	-7345.816068
CO ₂ e	-7370.434357

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-9.504896
SO _x	-2.453620
NO _x	-2.416858
CO	-174.607315

Pollutant	Emissions Per Year (TONs)
PM 10	-4.249731
PM 2.5	-3.813249
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.308881
N ₂ O	-0.060263

Pollutant	Emissions Per Year (TONs)
CO ₂	-7345.816068
CO ₂ e	-7370.434357

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	45,336
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	1.59
Climb Out [Intermediate] (mins):	1.15
Takeoff [Military] (mins):	0.34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Add T-7A LTOs

- Activity Description:

In 2037, add 7 T-7As and 5,513 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 1,985 CPs.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	39.944588
SO _x	2.381872
NO _x	27.625180
CO	89.003174

Pollutant	Emissions Per Year (TONs)
PM 10	1.434494
PM 2.5	1.332660
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.275205
N ₂ O	0.052409

Pollutant	Emissions Per Year (TONs)
CO ₂	6900.927724
CO ₂ e	6922.521895

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	38.997144
SO _x	2.128536
NO _x	21.615735
CO	81.473289

Pollutant	Emissions Per Year (TONs)
PM 10	0.556229
PM 2.5	0.493374
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.254895
N ₂ O	0.048386

Pollutant	Emissions Per Year (TONs)
CO ₂	6408.288005
CO ₂ e	6428.247241

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.290701
SO _x	0.072634
NO _x	0.985789
CO	6.446192

Pollutant	Emissions Per Year (TONs)
PM 10	0.143516
PM 2.5	0.128888
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009144
N ₂ O	0.001784

Pollutant	Emissions Per Year (TONs)
CO ₂	217.456395
CO ₂ e	218.185164

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.656744
SO _x	0.180702
NO _x	5.023656
CO	1.083693

Pollutant	Emissions Per Year (TONs)
PM 10	0.734748
PM 2.5	0.710398
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011166
N ₂ O	0.002240

Pollutant	Emissions Per Year (TONs)
CO ₂	275.183325
CO ₂ e	276.089490

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	7
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	5,513
Number of Annual Trim Test(s) per Aircraft:	9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	17.16
Approach [Approach] (mins):	5.18
Climb Out [Intermediate] (mins):	0.99
Takeoff [Military] (mins):	0.68
Takeoff [Afterburn] (mins):	0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

36.4 Auxiliary Power Unit (APU)

36.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
1	0.25	No	4501687C	Hamilton Sundstrand

36.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
4501687C	211.0	0.010	0.230	1.380	1.070	-1.000	-1.000

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
4501687C	211.0	0.0	0.0	740.4	740.7

36.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL} : Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
 EF_{POL} : Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

36.5 Aircraft Engine Test Cell

36.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 7

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 3
Idle Duration (mins): 0
Approach Duration (mins): 0
Intermediate Duration (mins): 12
Military Duration (mins): 8
Afterburner Duration (mins): 7

36.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

36.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} +$$

$$\text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

36.6 Aerospace Ground Equipment (AGE)

36.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 5,513

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

36.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

36.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Add T-7A CPs

- Activity Description:

In 2037, add 21,086 T-7A CPs not included in LTOs.

1,985 CPs included in LTOs + 21,086 CPs not included in LTOs = 23,071 CPs in 2037.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	5.156384
SO _x	2.884220
NO _x	46.642087
CO	8.279791

Pollutant	Emissions Per Year (TONs)
PM 10	0.327884
PM 2.5	0.280751
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.363088
N ₂ O	0.070839

Pollutant	Emissions Per Year (TONs)
CO ₂	8634.976069
CO ₂ e	8663.914765

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	5.156384
SO _x	2.884220
NO _x	46.642087
CO	8.279791

Pollutant	Emissions Per Year (TONs)
PM 10	0.327884
PM 2.5	0.280751
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.363088
N ₂ O	0.070839

Pollutant	Emissions Per Year (TONs)
CO ₂	8634.976069
CO ₂ e	8663.914765

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 7
 Flight Operation Cycle Type: CP (Close Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 21,086
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 1.59
 Climb Out [Intermediate] (mins): 1.15
 Takeoff [Military] (mins): 0.34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Remove T-38Cs and LTOs

- Activity Description:

By 2037, remove 47 T-38Cs and 3,142 LTOs, including flightline maintenance (trim test/trim pad runups) and engine test cell, and AGE.

Includes 1,131 CPs.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-12.684719
SO _x	-1.373722
NO _x	-5.246094
CO	-141.434019

Pollutant	Emissions Per Year (TONs)
PM 10	-3.761470
PM 2.5	-3.411681
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.166334
N ₂ O	-0.032487

Pollutant	Emissions Per Year (TONs)
CO ₂	-3961.247924
CO ₂ e	-3974.514235

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-11.647537
SO _x	-1.129948
NO _x	-1.790267
CO	-134.185236

Pollutant	Emissions Per Year (TONs)
PM 10	-3.255518
PM 2.5	-2.928119
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.142247
N ₂ O	-0.027752

Pollutant	Emissions Per Year (TONs)
CO ₂	-3382.916471
CO ₂ e	-3394.253757

- Activity Emissions of Criteria Pollutants [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.662888
SO _x	-0.140787
NO _x	-0.592717
CO	-6.631159

Pollutant	Emissions Per Year (TONs)
PM 10	-0.087200
PM 2.5	-0.078688
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.017723
N ₂ O	-0.003458

Pollutant	Emissions Per Year (TONs)
CO ₂	-421.497423
CO ₂ e	-422.910002

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.374295
SO _x	-0.102987
NO _x	-2.863110
CO	-0.617624

Pollutant	Emissions Per Year (TONs)
PM 10	-0.418752
PM 2.5	-0.404874
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006364
N ₂ O	-0.001276

Pollutant	Emissions Per Year (TONs)
CO ₂	-156.834030
CO ₂ e	-157.350477

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 3,142
Number of Annual Trim Test(s) per Aircraft: 9

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 18.56
Approach [Approach] (mins): 5.18
Climb Out [Intermediate] (mins): 0.99
Takeoff [Military] (mins): 0.37
Takeoff [Afterburn] (mins): 0.33

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	10
Intermediate (mins):	7.5
Military (mins):	2
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38.4 Auxiliary Power Unit (APU)

38.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

38.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e

38.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

38.5 Aircraft Engine Test Cell

38.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 94

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine):	2
Idle Duration (mins):	0
Approach Duration (mins):	0
Intermediate Duration (mins):	12
Military Duration (mins):	8
Afterburner Duration (mins):	7

38.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

38.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} + \text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for Afterburner Power Setting (TONs)

38.6 Aerospace Ground Equipment (AGE)

38.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 3,142

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

38.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-1-1	2.5	0.0	0.0	56.7	56.9
TF-1	0.0	0.0	0.0	33.0	33.1

38.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$\text{AGE}_{\text{POL}} = \text{AGE} * \text{OH} * \text{LTO} * \text{EF}_{\text{POL}} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037 Remove T-38C CPs

- Activity Description:

By 2037, remove 12,020 T-38C CPs not included in LTOs.

1,131 CPs included in LTOs + 12,020 CPs not included in LTOs = 13,151 CPs in 2037.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-2.520047
SO _x	-0.650532
NO _x	-0.640785
CO	-46.293893

Pollutant	Emissions Per Year (TONs)
PM 10	-1.126737
PM 2.5	-1.011012
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.081894
N ₂ O	-0.015978

Pollutant	Emissions Per Year (TONs)
CO ₂	-1947.606960
CO ₂ e	-1954.134043

- Activity Emissions of Criteria Pollutants [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-2.520047
SO _x	-0.650532
NO _x	-0.640785
CO	-46.293893

Pollutant	Emissions Per Year (TONs)
PM 10	-1.126737
PM 2.5	-1.011012
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [CP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.081894
N ₂ O	-0.015978

Pollutant	Emissions Per Year (TONs)
CO ₂	-1947.606960
CO ₂ e	-1954.134043

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: CP (Close Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 12,020
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 1.59
Climb Out [Intermediate] (mins): 1.15
Takeoff [Military] (mins): 0.34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

Sheppard AFB ROI: Alternative 3 GHG Report

AIR CONFORMITY APPLICABILITY MODEL REPORT GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to estimate GHG emissions associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the GHG emissions analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State: Texas

County(s): Wichita

Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2031

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action's start through the action's "steady state" (SS, net gain/loss in emission stabilized and the action is fully implemented) of emissions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO₂ equivalents (CO₂e). The CO₂e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO₂. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 tons per year (ton/yr) of CO₂e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO₂e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO₂e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected steady state of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e	Threshold	Exceedance
2031	2,707	0.10583419	0.03961577	2,720	68,039	No
2032	1,316	0.05015761	0.02649167	1,324	68,039	No
2033	391	0.01044379	0.00695799	393	68,039	No
2034	5,096	0.20173808	0.04372075	5,113	68,039	No
2035	15,398	0.61070985	0.12125257	15,447	68,039	No
2036	25,937	1.02860889	0.2004302	26,019	68,039	No
2037	34,500	1.37617662	0.26546508	34,609	68,039	No
2038 [SS Year]	34,500	1.37617662	0.26546508	34,609	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. <https://statesummaries.ncics.org/downloads/>).

State's Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2031	700,652,689	3,554,625	135,896	836,194,567
2032	700,652,689	3,554,625	135,896	836,194,567
2033	700,652,689	3,554,625	135,896	836,194,567
2034	700,652,689	3,554,625	135,896	836,194,567
2035	700,652,689	3,554,625	135,896	836,194,567
2036	700,652,689	3,554,625	135,896	836,194,567
2037	700,652,689	3,554,625	135,896	836,194,567
2038 [SS Year]	700,652,689	3,554,625	135,896	836,194,567

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO2	CH4	N2O	CO2e
2031	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2032	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2033	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2034	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2035	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2036	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2037	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2038 [SS Year]	5,136,454,179	25,626,912	1,500,708	6,251,695,230

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact on local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where the action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO2	CH4	N2O	CO2e
2031-2038	State Total	5,605,221,516	28,436,999	1,087,166	6,689,556,535
2031-2038	U.S. Total	41,091,633,432	205,015,293	12,005,661	50,013,561,837
2031-2038	Action	119,845	4.759846	0.969399	120,235
Percent of State Totals		0.00213810%	0.00001674%	0.00008917%	0.00179736%
Percent of U.S. Totals		0.00029165%	0.00000232%	0.00000807%	0.00024041%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00003221%.*

* Global value based on the U.S. emitting 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, <https://www.c2es.org/content/international-emissions>).

SUA ROI

SUA ROI: Alternative 1 ACAM Report (Low Flight Patterns)

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1, SUA Low Flight Pattern

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite

repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

 applicable
 X not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving “steady state” (i.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts on local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact on air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (i.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2034

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.666	250	No
NOx	10.872	250	No
CO	-3.467	250	No
SOx	0.223	250	No
PM 10	-0.095	250	No
PM 2.5	-0.086	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2035

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	3.139	250	No
NOx	52.841	250	No
CO	-21.591	250	No
SOx	0.931	250	No
PM 10	-0.630	250	No
PM 2.5	-0.568	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2036

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.390	250	No
NOx	91.769	250	No
CO	-40.430	250	No
SOx	1.522	250	No
PM 10	-1.200	250	No
PM 2.5	-1.082	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2037

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.704	250	No
NOx	97.988	250	No
CO	-45.645	250	No
SOx	1.545	250	No
PM 10	-1.371	250	No
PM 2.5	-1.235	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.704	250	No
NOx	97.988	250	No
CO	-45.645	250	No
SOx	1.545	250	No
PM 10	-1.371	250	No
PM 2.5	-1.235	250	No
Pb	0.000	25	No
NH3	0.000	250	No

None of the estimated annual net emissions associated with this action are above the insignificance indicators; therefore, the action will not cause or contribute to an exceedance of one or more NAAQSs and will have an insignificant impact on air quality. No further air assessment is needed.

Carolyn Hein, Contractor

May 12, 2025

Name, Title

Date

SUA ROI: Alternative 1 ACAM Detail Report (Low Flight Patterns)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1, SUA Low Flight Pattern

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-

site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (IR-103)
3.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-158)
4.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-159)
5.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1141)
6.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1142)
7.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1143)
8.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1146)
9.	Aircraft	2034: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
10.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (IR-103)
11.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-158)
12.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-159)
13.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1141)
14.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1142)
15.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1143)
16.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)
17.	Aircraft	2034: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
18.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (IR-103)
19.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-158)
20.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-159)
21.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1141)
22.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1142)
23.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1143)
24.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1146)
25.	Aircraft	2035: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
26.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (IR-103)
27.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-158)
28.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-159)
29.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1141)
30.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1142)
31.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1143)
32.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)
33.	Aircraft	2035: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
34.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (IR-103)
35.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-158)
36.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-159)
37.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1141)
38.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1142)

Activity Type		Activity Title
39.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1143)
40.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1146)
41.	Aircraft	2036: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
42.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (IR-103)
43.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-158)
44.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-159)
45.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1141)
46.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1142)
47.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1143)
48.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)
49.	Aircraft	2036: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
50.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (IR-103)
51.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-158)
52.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-159)
53.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1141)
54.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1142)
55.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1143)
56.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1146)
57.	Aircraft	2037: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
58.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-158)
59.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-159)
60.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1141)
61.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1142)
62.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1143)
63.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)
64.	Aircraft	2037: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
65.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (IR-103)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2034, add 3 T-7A Low-Altitude Operations in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.011483
SO _x	0.005413
NO _x	0.166931
CO	0.009510

Pollutant	Emissions Per Year (TONs)
PM 10	0.000809
PM 2.5	0.000708
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.011483
SO _x	0.005413
NO _x	0.166931
CO	0.009510

Pollutant	Emissions Per Year (TONs)
PM 10	0.000809
PM 2.5	0.000708
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 3
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2034, add 4 T-7A Low-Altitude Operations in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.026793
SO _x	0.012629
NO _x	0.389505
CO	0.022190

Pollutant	Emissions Per Year (TONs)
PM 10	0.001889
PM 2.5	0.001652
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.026793
SO _x	0.012629
NO _x	0.389505
CO	0.022190

Pollutant	Emissions Per Year (TONs)
PM 10	0.001889
PM 2.5	0.001652
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2034, add 51 T-7A Low-Altitude Operations in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.331853
SO _x	0.156424
NO _x	4.824291
CO	0.274838

Pollutant	Emissions Per Year (TONs)
PM 10	0.023391
PM 2.5	0.020467
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.331853
SO _x	0.156424
NO _x	4.824291
CO	0.274838

Pollutant	Emissions Per Year (TONs)
PM 10	0.023391
PM 2.5	0.020467
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 51
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MTR Low-Altitude Operations (VR-1141)

- **Activity Description:**

In 2034, add 5 T-7A Low-Altitude Operations in VR-1141 with 28 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2034

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.034448
SO _x	0.016238
NO _x	0.500792
CO	0.028530

Pollutant	Emissions Per Year (TONs)
PM 10	0.002428
PM 2.5	0.002125
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.034448
SO _x	0.016238
NO _x	0.500792
CO	0.028530

Pollutant	Emissions Per Year (TONs)
PM 10	0.002428
PM 2.5	0.002125
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2034, add 6 T-7A Low-Altitude Operations in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.041338
SO _x	0.019485
NO _x	0.600950
CO	0.034236

Pollutant	Emissions Per Year (TONs)
PM 10	0.002914
PM 2.5	0.002549
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.041338
SO _x	0.019485
NO _x	0.600950
CO	0.034236

Pollutant	Emissions Per Year (TONs)
PM 10	0.002914
PM 2.5	0.002549
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 6
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2034, add 31 T-7A Low-Altitude Operations in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.243244
SO _x	0.114657
NO _x	3.536144
CO	0.201453

Pollutant	Emissions Per Year (TONs)
PM 10	0.017145
PM 2.5	0.015002
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.243244
SO _x	0.114657
NO _x	3.536144
CO	0.201453

Pollutant	Emissions Per Year (TONs)
PM 10	0.017145
PM 2.5	0.015002
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 31
Number of Annual Trim Test(s) per Aircraft: 0

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- **Trim Test**

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

7.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for Flight Operation Cycles per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Flight Operation Cycles per Year**

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for Trim per Year**

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 10 T-7A Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 10
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2034, add 101 T-7A Low-Altitude Operations in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.006440
SO _x	0.003582
NO _x	0.045751
CO	0.010157

Pollutant	Emissions Per Year (TONs)
PM 10	0.000386
PM 2.5	0.000327
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000451
N ₂ O	0.000088

Pollutant	Emissions Per Year (TONs)
CO ₂	10.725112
CO ₂ e	10.761056

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.006440
SO _x	0.003582
NO _x	0.045751
CO	0.010157

Pollutant	Emissions Per Year (TONs)
PM 10	0.000386
PM 2.5	0.000327
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000451
N ₂ O	0.000088

Pollutant	Emissions Per Year (TONs)
CO ₂	10.725112
CO ₂ e	10.761056

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 101
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2034, remove 3 T-38C Low-Altitude Operations in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.001665
SO _x	-0.002375
NO _x	-0.004262
CO	-0.068798

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002509
PM 2.5	-0.002242
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.001665
SO _x	-0.002375
NO _x	-0.004262
CO	-0.068798

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002509
PM 2.5	-0.002242
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

10.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	3
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2034, remove 4 T-38C Low-Altitude Operations in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003885
SO _x	-0.005543
NO _x	-0.009946
CO	-0.160528

Pollutant	Emissions Per Year (TONs)
PM 10	-0.005853
PM 2.5	-0.005232
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003885
SO _x	-0.005543
NO _x	-0.009946
CO	-0.160528

Pollutant	Emissions Per Year (TONs)
PM 10	-0.005853
PM 2.5	-0.005232
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

11.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

11.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2034, remove 45 T-38C Low-Altitude Operations in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042458
SO _x	-0.060573
NO _x	-0.108691
CO	-1.754344

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063969
PM 2.5	-0.057176
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042458
SO _x	-0.060573
NO _x	-0.108691
CO	-1.754344

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063969
PM 2.5	-0.057176
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

12.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 45
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

12.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2034, remove 4 T-38C Low-Altitude Operations in VR-1141 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003996
SO _x	-0.005701
NO _x	-0.010230
CO	-0.165115

Pollutant	Emissions Per Year (TONs)
PM 10	-0.006021
PM 2.5	-0.005381
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003996
SO _x	-0.005701
NO _x	-0.010230
CO	-0.165115

Pollutant	Emissions Per Year (TONs)
PM 10	-0.006021
PM 2.5	-0.005381
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

13.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

13.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2034, remove 5 T-38C Low-Altitude Operations in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004995
SO _x	-0.007126
NO _x	-0.012787
CO	-0.206393

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007526
PM 2.5	-0.006727
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004995
SO _x	-0.007126
NO _x	-0.012787
CO	-0.206393

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007526
PM 2.5	-0.006727
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

14.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

14.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2034, remove 27 T-38C Low-Altitude Operations in VR-1143 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.030719
SO _x	-0.043826
NO _x	-0.078641
CO	-1.269319

Pollutant	Emissions Per Year (TONs)
PM 10	-0.046284
PM 2.5	-0.041369
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.030719
SO _x	-0.043826
NO _x	-0.078641
CO	-1.269319

Pollutant	Emissions Per Year (TONs)
PM 10	-0.046284
PM 2.5	-0.041369
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

15.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 27
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

15.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

16. Aircraft

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, remove 9 T-38C Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

16.2 Aircraft & Engines

16.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

16.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gases Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

16.3 Flight Operations

16.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	9
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

16.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

17. Aircraft

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2034, remove 89 T-38C Low-Altitude Operations in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005080
SO _x	-0.001140

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002165
PM 2.5	-0.001945

Pollutant	Emissions Per Year (TONs)
NO _x	-0.000803
CO	-0.091491

Pollutant	Emissions Per Year (TONs)
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000144
N ₂ O	-0.000028

Pollutant	Emissions Per Year (TONs)
CO ₂	-3.414146
CO ₂ e	-3.425588

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005080
SO _x	-0.001140
NO _x	-0.000803
CO	-0.091491

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002165
PM 2.5	-0.001945
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000144
N ₂ O	-0.000028

Pollutant	Emissions Per Year (TONs)
CO ₂	-3.414146
CO ₂ e	-3.425588

17.2 Aircraft & Engines

17.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

17.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

17.3 Flight Operations

17.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	89
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

17.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2035, add 13 T-7A Low-Altitude Operations in IR-103 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.049759
SO _x	0.023455
NO _x	0.723366
CO	0.041210

Pollutant	Emissions Per Year (TONs)
PM 10	0.003507
PM 2.5	0.003069
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.049759
SO _x	0.023455
NO _x	0.723366
CO	0.041210

Pollutant	Emissions Per Year (TONs)
PM 10	0.003507
PM 2.5	0.003069
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

18.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 13
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

18.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2035, add 16 T-7A Low-Altitude Operations in VR-158 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.107173
SO _x	0.050518
NO _x	1.558018
CO	0.088760

Pollutant	Emissions Per Year (TONs)
PM 10	0.007554
PM 2.5	0.006610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.107173
SO _x	0.050518
NO _x	1.558018
CO	0.088760

Pollutant	Emissions Per Year (TONs)
PM 10	0.007554
PM 2.5	0.006610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

19.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

19.3 Flight Operations

19.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 16
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

19.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

20. Aircraft

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2035, add 196 T-7A Low-Altitude Operations in VR-159 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.275356
SO _x	0.601159
NO _x	18.540414
CO	1.056242

Pollutant	Emissions Per Year (TONs)
PM 10	0.089893
PM 2.5	0.078656
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.275356
SO _x	0.601159
NO _x	18.540414
CO	1.056242

Pollutant	Emissions Per Year (TONs)
PM 10	0.089893
PM 2.5	0.078656
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

20.2 Aircraft & Engines

20.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

20.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

20.3 Flight Operations

20.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	196
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

20.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

21. Aircraft

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2035, add 19 T-7A Low-Altitude Operations in VR-1141 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.130904
SO _x	0.061704
NO _x	1.903008
CO	0.108414

Pollutant	Emissions Per Year (TONs)
PM 10	0.009227
PM 2.5	0.008073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.130904
SO _x	0.061704
NO _x	1.903008
CO	0.108414

Pollutant	Emissions Per Year (TONs)
PM 10	0.009227
PM 2.5	0.008073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

21.2 Aircraft & Engines

21.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

21.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

21.3 Flight Operations

21.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 19
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

21.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

22. Aircraft

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2035: Add T-7A MTR Low-Altitude Operations (VR-1142)

- **Activity Description:**

In 2035, add 24 T-7A Low-Altitude Operations in VR-1142 with 76 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2035

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.165352
SO _x	0.077941
NO _x	2.403799
CO	0.136944

Pollutant	Emissions Per Year (TONs)
PM 10	0.011655
PM 2.5	0.010198
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.165352
SO _x	0.077941
NO _x	2.403799
CO	0.136944

Pollutant	Emissions Per Year (TONs)
PM 10	0.011655
PM 2.5	0.010198
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

22.2 Aircraft & Engines

22.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

22.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

22.3 Flight Operations

22.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	24
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

22.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

23. Aircraft

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2035, add 120 T-7A Low-Altitude Operations in VR-1143 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.941589
SO _x	0.443833
NO _x	13.688301
CO	0.779818

Pollutant	Emissions Per Year (TONs)
PM 10	0.066368
PM 2.5	0.058072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.941589
SO _x	0.443833
NO _x	13.688301
CO	0.779818

Pollutant	Emissions Per Year (TONs)
PM 10	0.066368
PM 2.5	0.058072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

23.2 Aircraft & Engines

23.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

23.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

23.3 Flight Operations

23.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 120
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

23.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, add 40 T-7A Low-Altitude Operations in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 40
Number of Annual Trim Test(s) per Aircraft: 0

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- **Trim Test**

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for Flight Operation Cycles per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Flight Operation Cycles per Year**

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for Trim per Year**

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2035, add 389 T-7A Low-Altitude Operations in R-5601 Falcon Range with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.024804
SO _x	0.013797
NO _x	0.176211
CO	0.039118

Pollutant	Emissions Per Year (TONs)
PM 10	0.001488
PM 2.5	0.001261
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001737
N ₂ O	0.000339

Pollutant	Emissions Per Year (TONs)
CO ₂	41.307611
CO ₂ e	41.446046

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.024804
SO _x	0.013797
NO _x	0.176211
CO	0.039118

Pollutant	Emissions Per Year (TONs)
PM 10	0.001488
PM 2.5	0.001261
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001737
N ₂ O	0.000339

Pollutant	Emissions Per Year (TONs)
CO ₂	41.307611
CO ₂ e	41.446046

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 389
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2035, remove 14 T-38C Low-Altitude Operations in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.007770
SO _x	-0.011085
NO _x	-0.019891
CO	-0.321056

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011707
PM 2.5	-0.010464
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.007770
SO _x	-0.011085
NO _x	-0.019891
CO	-0.321056

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011707
PM 2.5	-0.010464
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	14
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2035, remove 18 T-38C Low-Altitude Operations in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 18
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2035, remove 224 T-38C Low-Altitude Operations in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.211344
SO _x	-0.301517
NO _x	-0.541041
CO	-8.732734

Pollutant	Emissions Per Year (TONs)
PM 10	-0.318425
PM 2.5	-0.284610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.211344
SO _x	-0.301517
NO _x	-0.541041
CO	-8.732734

Pollutant	Emissions Per Year (TONs)
PM 10	-0.318425
PM 2.5	-0.284610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	224
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2035, remove 21 T-38C Low-Altitude Operations in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.020979
SO _x	-0.029930
NO _x	-0.053706
CO	-0.866852

Pollutant	Emissions Per Year (TONs)
PM 10	-0.031608
PM 2.5	-0.028252
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003768
N ₂ O	-0.000735

Pollutant	Emissions Per Year (TONs)
CO ₂	-89.606624
CO ₂ e	-89.906925

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.020979
SO _x	-0.029930
NO _x	-0.053706
CO	-0.866852

Pollutant	Emissions Per Year (TONs)
PM 10	-0.031608
PM 2.5	-0.028252
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003768
N ₂ O	-0.000735

Pollutant	Emissions Per Year (TONs)
CO ₂	-89.606624
CO ₂ e	-89.906925

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	21
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2035, remove 27 T-38C Low-Altitude Operations in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.026973
SO _x	-0.038481
NO _x	-0.069051
CO	-1.114524

Pollutant	Emissions Per Year (TONs)
PM 10	-0.040639
PM 2.5	-0.036324
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.026973
SO _x	-0.038481
NO _x	-0.069051
CO	-1.114524

Pollutant	Emissions Per Year (TONs)
PM 10	-0.040639
PM 2.5	-0.036324
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 27
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2035, remove 137 T-38C Low-Altitude Operations in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.155872
SO _x	-0.222377
NO _x	-0.399032
CO	-6.440621

Pollutant	Emissions Per Year (TONs)
PM 10	-0.234847
PM 2.5	-0.209907
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.155872
SO _x	-0.222377
NO _x	-0.399032
CO	-6.440621

Pollutant	Emissions Per Year (TONs)
PM 10	-0.234847
PM 2.5	-0.209907
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	137
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, remove 45 T-38C Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	45
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2035, remove 444 T-38C Low-Altitude Operations in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025345
SO _x	-0.005689
NO _x	-0.004007
CO	-0.456427

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010802
PM 2.5	-0.009702
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000716
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.032370
CO ₂ e	-17.089451

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025345
SO _x	-0.005689
NO _x	-0.004007
CO	-0.456427

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010802
PM 2.5	-0.009702
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000716
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.032370
CO ₂ e	-17.089451

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 444
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2036, add 12 T-7A Low-Altitude Operations in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.045931
SO _x	0.021650
NO _x	0.667722
CO	0.038040

Pollutant	Emissions Per Year (TONs)
PM 10	0.003237
PM 2.5	0.002833
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002726
N ₂ O	0.000532

Pollutant	Emissions Per Year (TONs)
CO ₂	64.818405
CO ₂ e	65.035633

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.045931
SO _x	0.021650
NO _x	0.667722
CO	0.038040

Pollutant	Emissions Per Year (TONs)
PM 10	0.003237
PM 2.5	0.002833
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002726
N ₂ O	0.000532

Pollutant	Emissions Per Year (TONs)
CO ₂	64.818405
CO ₂ e	65.035633

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 12
Number of Annual Trim Test(s) per Aircraft: 0

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- **Trim Test**

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

34.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for Flight Operation Cycles per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Flight Operation Cycles per Year**

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for Trim per Year**

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2036, add 14 T-7A Low-Altitude Operations in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.093776
SO _x	0.044203
NO _x	1.363266
CO	0.077665

Pollutant	Emissions Per Year (TONs)
PM 10	0.006610
PM 2.5	0.005784
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005565
N ₂ O	0.001086

Pollutant	Emissions Per Year (TONs)
CO ₂	132.337577
CO ₂ e	132.781084

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.093776
SO _x	0.044203
NO _x	1.363266
CO	0.077665

Pollutant	Emissions Per Year (TONs)
PM 10	0.006610
PM 2.5	0.005784
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005565
N ₂ O	0.001086

Pollutant	Emissions Per Year (TONs)
CO ₂	132.337577
CO ₂ e	132.781084

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	14
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2036, add 183 T-7A Low-Altitude Operations in VR-159 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.190766
SO _x	0.561286
NO _x	17.310693
CO	0.986185

Pollutant	Emissions Per Year (TONs)
PM 10	0.083931
PM 2.5	0.073439
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070659
N ₂ O	0.013786

Pollutant	Emissions Per Year (TONs)
CO ₂	1680.417149
CO ₂ e	1686.048789

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.190766
SO _x	0.561286
NO _x	17.310693
CO	0.986185

Pollutant	Emissions Per Year (TONs)
PM 10	0.083931
PM 2.5	0.073439
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070659
N ₂ O	0.013786

Pollutant	Emissions Per Year (TONs)
CO ₂	1680.417149
CO ₂ e	1686.048789

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 183
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2036, add 17 T-7A Low-Altitude Operations in VR-1141 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.117125
SO _x	0.055208
NO _x	1.702691
CO	0.097002

Pollutant	Emissions Per Year (TONs)
PM 10	0.008255
PM 2.5	0.007224
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006950
N ₂ O	0.001356

Pollutant	Emissions Per Year (TONs)
CO ₂	165.286933
CO ₂ e	165.840864

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.117125
SO _x	0.055208
NO _x	1.702691
CO	0.097002

Pollutant	Emissions Per Year (TONs)
PM 10	0.008255
PM 2.5	0.007224
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006950
N ₂ O	0.001356

Pollutant	Emissions Per Year (TONs)
CO ₂	165.286933
CO ₂ e	165.840864

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	17
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2036, add 22 T-7A Low-Altitude Operations in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.151573
SO _x	0.071446
NO _x	2.203483
CO	0.125532

Pollutant	Emissions Per Year (TONs)
PM 10	0.010684
PM 2.5	0.009348
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008994
N ₂ O	0.001755

Pollutant	Emissions Per Year (TONs)
CO ₂	213.900736
CO ₂ e	214.617589

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.151573
SO _x	0.071446
NO _x	2.203483
CO	0.125532

Pollutant	Emissions Per Year (TONs)
PM 10	0.010684
PM 2.5	0.009348
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008994
N ₂ O	0.001755

Pollutant	Emissions Per Year (TONs)
CO ₂	213.900736
CO ₂ e	214.617589

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 22
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Low-Altitude Operations (VR-1143)

- **Activity Description:**

In 2036, add 113 T-7A Low-Altitude Operations in VR-1143 with 108 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2036

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.886663
SO _x	0.417943
NO _x	12.889817
CO	0.734329

Pollutant	Emissions Per Year (TONs)
PM 10	0.062496
PM 2.5	0.054684
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.052614
N ₂ O	0.010265

Pollutant	Emissions Per Year (TONs)
CO ₂	1251.265292
CO ₂ e	1255.458701

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.886663
SO _x	0.417943
NO _x	12.889817
CO	0.734329

Pollutant	Emissions Per Year (TONs)
PM 10	0.062496
PM 2.5	0.054684
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.052614
N ₂ O	0.010265

Pollutant	Emissions Per Year (TONs)
CO ₂	1251.265292
CO ₂ e	1255.458701

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	113
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

40. Aircraft

40.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, add 37 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.269080
SO _x	0.126835
NO _x	3.911738
CO	0.222851

Pollutant	Emissions Per Year (TONs)
PM 10	0.018966
PM 2.5	0.016595
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.015967
N ₂ O	0.003115

Pollutant	Emissions Per Year (TONs)
CO ₂	379.727822
CO ₂ e	381.000417

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.269080
SO _x	0.126835
NO _x	3.911738
CO	0.222851

Pollutant	Emissions Per Year (TONs)
PM 10	0.018966
PM 2.5	0.016595
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.015967
N ₂ O	0.003115

Pollutant	Emissions Per Year (TONs)
CO ₂	379.727822
CO ₂ e	381.000417

40.2 Aircraft & Engines

40.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

40.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

40.3 Flight Operations

40.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 37
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

40.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

41. Aircraft

41.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2036, add 363 T-7A Low-Altitude Operations in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.023146
SO _x	0.012875
NO _x	0.164433
CO	0.036504

Pollutant	Emissions Per Year (TONs)
PM 10	0.001388
PM 2.5	0.001177
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001621
N ₂ O	0.000316

Pollutant	Emissions Per Year (TONs)
CO ₂	38.546691
CO ₂ e	38.675874

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.023146
SO _x	0.012875
NO _x	0.164433
CO	0.036504

Pollutant	Emissions Per Year (TONs)
PM 10	0.001388
PM 2.5	0.001177
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001621
N ₂ O	0.000316

Pollutant	Emissions Per Year (TONs)
CO ₂	38.546691
CO ₂ e	38.675874

41.2 Aircraft & Engines

41.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

41.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

41.3 Flight Operations

41.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 363
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

41.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

42. Aircraft

42.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2036, remove 15 T-38C Low-Altitude Operations in IR-103 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008325
SO _x	-0.011877
NO _x	-0.021312
CO	-0.343989

Pollutant	Emissions Per Year (TONs)
PM 10	-0.012543
PM 2.5	-0.011211
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008325
SO _x	-0.011877
NO _x	-0.021312
CO	-0.343989

Pollutant	Emissions Per Year (TONs)
PM 10	-0.012543
PM 2.5	-0.011211
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

42.2 Aircraft & Engines

42.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

42.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

42.3 Flight Operations

42.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

42.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

43. Aircraft

43.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2036, remove 18 T-38C Low-Altitude Operations in VR-158 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

43.2 Aircraft & Engines

43.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

43.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

43.3 Flight Operations

43.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	18
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

43.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

44. Aircraft

44.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2036, remove 229 T-38C Low-Altitude Operations in VR-159 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.216062
SO _x	-0.308248
NO _x	-0.553117
CO	-8.927661

Pollutant	Emissions Per Year (TONs)
PM 10	-0.325533
PM 2.5	-0.290963
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.216062
SO _x	-0.308248
NO _x	-0.553117
CO	-8.927661

Pollutant	Emissions Per Year (TONs)
PM 10	-0.325533
PM 2.5	-0.290963
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

44.2 Aircraft & Engines

44.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

44.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

44.3 Flight Operations

44.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 229
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

44.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

45. Aircraft

45.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2036, remove 22 T-38C Low-Altitude Operations in VR-1141 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.021978
SO _x	-0.031355
NO _x	-0.056264
CO	-0.908131

Pollutant	Emissions Per Year (TONs)
PM 10	-0.033114
PM 2.5	-0.029597
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.021978
SO _x	-0.031355
NO _x	-0.056264
CO	-0.908131

Pollutant	Emissions Per Year (TONs)
PM 10	-0.033114
PM 2.5	-0.029597
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

45.2 Aircraft & Engines

45.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

45.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

45.3 Flight Operations

45.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	22
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

45.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

46. Aircraft

46.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2036, remove 28 T-38C Low-Altitude Operations in VR-1142 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.027972
SO _x	-0.039907
NO _x	-0.071608
CO	-1.155803

Pollutant	Emissions Per Year (TONs)
PM 10	-0.042144
PM 2.5	-0.037669
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.027972
SO _x	-0.039907
NO _x	-0.071608
CO	-1.155803

Pollutant	Emissions Per Year (TONs)
PM 10	-0.042144
PM 2.5	-0.037669
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

46.2 Aircraft & Engines

46.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

46.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

46.3 Flight Operations

46.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	28
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

46.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

47. Aircraft

47.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2036, remove 141 T-38C Low-Altitude Operations in VR-1143 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.160423
SO _x	-0.228870
NO _x	-0.410682
CO	-6.628668

Pollutant	Emissions Per Year (TONs)
PM 10	-0.241704
PM 2.5	-0.216036
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.160423
SO _x	-0.228870
NO _x	-0.410682
CO	-6.628668

Pollutant	Emissions Per Year (TONs)
PM 10	-0.241704
PM 2.5	-0.216036
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

47.2 Aircraft & Engines

47.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

47.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

47.3 Flight Operations

47.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 141
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

47.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

48. Aircraft

48.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, remove 46 T-38C Low-Altitude Operations in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

48.2 Aircraft & Engines

48.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

48.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

48.3 Flight Operations

48.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	46
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

48.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

49. Aircraft

49.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? [Remove](#)

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2036, remove 454 T-38C Low-Altitude Operations in R-5601 Falcon Range with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025916
SO _x	-0.005817
NO _x	-0.004098
CO	-0.466707

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011045
PM 2.5	-0.009921
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000732
N ₂ O	-0.000143

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.415982
CO ₂ e	-17.474349

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025916
SO _x	-0.005817
NO _x	-0.004098
CO	-0.466707

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011045
PM 2.5	-0.009921
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000732
N ₂ O	-0.000143

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.415982
CO ₂ e	-17.474349

49.2 Aircraft & Engines

49.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

49.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

49.3 Flight Operations

49.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 454
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

49.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

50. Aircraft

50.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2037, add 2 T-7A Low-Altitude Operations in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.007655
SO _x	0.003608
NO _x	0.111287
CO	0.006340

Pollutant	Emissions Per Year (TONs)
PM 10	0.000540
PM 2.5	0.000472
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.007655
SO _x	0.003608
NO _x	0.111287
CO	0.006340

Pollutant	Emissions Per Year (TONs)
PM 10	0.000540
PM 2.5	0.000472
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

50.2 Aircraft & Engines

50.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

50.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

50.3 Flight Operations

50.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	2
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

50.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

51. Aircraft

51.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2037, add 2 T-7A Low-Altitude Operations in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.013397
SO _x	0.006315
NO _x	0.194752
CO	0.011095

Pollutant	Emissions Per Year (TONs)
PM 10	0.000944
PM 2.5	0.000826
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000795
N ₂ O	0.000155

Pollutant	Emissions Per Year (TONs)
CO ₂	18.905368
CO ₂ e	18.968726

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.013397
SO _x	0.006315
NO _x	0.194752
CO	0.011095

Pollutant	Emissions Per Year (TONs)
PM 10	0.000944
PM 2.5	0.000826
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000795
N ₂ O	0.000155

Pollutant	Emissions Per Year (TONs)
CO ₂	18.905368
CO ₂ e	18.968726

51.2 Aircraft & Engines

51.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

51.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

51.3 Flight Operations

51.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 2
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

51.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

52. Aircraft

52.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2037: Add T-7A MTR Low-Altitude Operations (VR-159)

- **Activity Description:**

In 2037, add 30 T-7A Low-Altitude Operations in VR-159 with 108 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2037

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.195208
SO _x	0.092014
NO _x	2.837819
CO	0.161670

Pollutant	Emissions Per Year (TONs)
PM 10	0.013759
PM 2.5	0.012039
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011583
N ₂ O	0.002260

Pollutant	Emissions Per Year (TONs)
CO ₂	275.478221
CO ₂ e	276.401441

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.195208
SO _x	0.092014
NO _x	2.837819
CO	0.161670

Pollutant	Emissions Per Year (TONs)
PM 10	0.013759
PM 2.5	0.012039
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011583
N ₂ O	0.002260

Pollutant	Emissions Per Year (TONs)
CO ₂	275.478221
CO ₂ e	276.401441

52.2 Aircraft & Engines

52.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

52.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

52.3 Flight Operations

52.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	30
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

52.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

53. Aircraft

53.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2037, add 3 T-7A Low-Altitude Operations in VR-1141 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.020669
SO _x	0.009743
NO _x	0.300475
CO	0.017118

Pollutant	Emissions Per Year (TONs)
PM 10	0.001457
PM 2.5	0.001275
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001226
N ₂ O	0.000239

Pollutant	Emissions Per Year (TONs)
CO ₂	29.168282
CO ₂ e	29.266035

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.020669
SO _x	0.009743
NO _x	0.300475
CO	0.017118

Pollutant	Emissions Per Year (TONs)
PM 10	0.001457
PM 2.5	0.001275
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001226
N ₂ O	0.000239

Pollutant	Emissions Per Year (TONs)
CO ₂	29.168282
CO ₂ e	29.266035

53.2 Aircraft & Engines

53.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

53.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

53.3 Flight Operations

53.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 3
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

53.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

54. Aircraft

54.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2037, add 4 T-7A Low-Altitude Operations in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.027559
SO _x	0.012990
NO _x	0.400633
CO	0.022824

Pollutant	Emissions Per Year (TONs)
PM 10	0.001942
PM 2.5	0.001700
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.027559
SO _x	0.012990
NO _x	0.400633
CO	0.022824

Pollutant	Emissions Per Year (TONs)
PM 10	0.001942
PM 2.5	0.001700
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

54.2 Aircraft & Engines

54.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

54.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

54.3 Flight Operations

54.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 4
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

54.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

55. Aircraft

55.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2037, add 18 T-7A Low-Altitude Operations in VR-1143 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.141238
SO _x	0.066575
NO _x	2.053245
CO	0.116973

Pollutant	Emissions Per Year (TONs)
PM 10	0.009955
PM 2.5	0.008711
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008381
N ₂ O	0.001635

Pollutant	Emissions Per Year (TONs)
CO ₂	199.316595
CO ₂ e	199.984572

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.141238
SO _x	0.066575
NO _x	2.053245
CO	0.116973

Pollutant	Emissions Per Year (TONs)
PM 10	0.009955
PM 2.5	0.008711
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008381
N ₂ O	0.001635

Pollutant	Emissions Per Year (TONs)
CO ₂	199.316595
CO ₂ e	199.984572

55.2 Aircraft & Engines

55.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

55.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

55.3 Flight Operations

55.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	18
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

55.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

56. Aircraft

56.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, add 6 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.043635
SO _x	0.020568
NO _x	0.634336
CO	0.036138

Pollutant	Emissions Per Year (TONs)
PM 10	0.003076
PM 2.5	0.002691
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002589
N ₂ O	0.000505

Pollutant	Emissions Per Year (TONs)
CO ₂	61.577485
CO ₂ e	61.783851

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.043635
SO _x	0.020568
NO _x	0.634336
CO	0.036138

Pollutant	Emissions Per Year (TONs)
PM 10	0.003076
PM 2.5	0.002691
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002589
N ₂ O	0.000505

Pollutant	Emissions Per Year (TONs)
CO ₂	61.577485
CO ₂ e	61.783851

56.2 Aircraft & Engines

56.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

56.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

56.3 Flight Operations

56.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 6
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 38
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

56.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

57. Aircraft

57.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2037, add 59 T-7A Low-Altitude Operations in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.003762
SO _x	0.002093
NO _x	0.026726
CO	0.005933

Pollutant	Emissions Per Year (TONs)
PM 10	0.000226
PM 2.5	0.000191
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000263
N ₂ O	0.000051

Pollutant	Emissions Per Year (TONs)
CO ₂	6.265165
CO ₂ e	6.286161

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.003762
SO _x	0.002093
NO _x	0.026726
CO	0.005933

Pollutant	Emissions Per Year (TONs)
PM 10	0.000226
PM 2.5	0.000191
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000263
N ₂ O	0.000051

Pollutant	Emissions Per Year (TONs)
CO ₂	6.265165
CO ₂ e	6.286161

57.2 Aircraft & Engines

57.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

57.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

57.3 Flight Operations

57.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	59
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

57.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

58. Aircraft

58.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2037, remove 5 T-38C Low-Altitude Operations in VR-158 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004856
SO _x	-0.006928
NO _x	-0.012432
CO	-0.200660

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007317
PM 2.5	-0.006540
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004856
SO _x	-0.006928
NO _x	-0.012432
CO	-0.200660

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007317
PM 2.5	-0.006540
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

58.2 Aircraft & Engines

58.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

58.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

58.3 Flight Operations

58.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 5
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

58.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

59. Aircraft

59.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2037, remove 61 T-38C Low-Altitude Operations in VR-159 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.057554
SO _x	-0.082110
NO _x	-0.147337
CO	-2.378111

Pollutant	Emissions Per Year (TONs)
PM 10	-0.086714
PM 2.5	-0.077505
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.057554
SO _x	-0.082110
NO _x	-0.147337
CO	-2.378111

Pollutant	Emissions Per Year (TONs)
PM 10	-0.086714
PM 2.5	-0.077505
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

59.2 Aircraft & Engines

59.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

59.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

59.3 Flight Operations

59.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	61
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

59.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

60. Aircraft

60.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2037, remove 6 T-38C Low-Altitude Operations in VR-1141 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005994
SO _x	-0.008551
NO _x	-0.015345
CO	-0.247672

Pollutant	Emissions Per Year (TONs)
PM 10	-0.009031
PM 2.5	-0.008072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005994
SO _x	-0.008551
NO _x	-0.015345
CO	-0.247672

Pollutant	Emissions Per Year (TONs)
PM 10	-0.009031
PM 2.5	-0.008072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

60.2 Aircraft & Engines

60.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

60.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

60.3 Flight Operations

60.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	6
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

60.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

61. Aircraft

61.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2037, remove 7 T-38C Low-Altitude Operations in VR-1142 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006993
SO _x	-0.009977
NO _x	-0.017902
CO	-0.288951

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010536
PM 2.5	-0.009417
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006993
SO _x	-0.009977
NO _x	-0.017902
CO	-0.288951

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010536
PM 2.5	-0.009417
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

61.2 Aircraft & Engines

61.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

61.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

61.3 Flight Operations

61.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 7
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

61.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

62. Aircraft

62.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2037, remove 37 T-38C Low-Altitude Operations in VR-1143 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042097
SO _x	-0.060058
NO _x	-0.107768
CO	-1.739438

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063426
PM 2.5	-0.056690
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042097
SO _x	-0.060058
NO _x	-0.107768
CO	-1.739438

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063426
PM 2.5	-0.056690
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

62.2 Aircraft & Engines

62.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

62.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

62.3 Flight Operations

62.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	37
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

62.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

63. Aircraft

63.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, remove 12 T-38C Low-Altitude Operations in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

63.2 Aircraft & Engines

63.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

63.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

63.3 Flight Operations

63.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	12
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

63.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

64. Aircraft

64.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2037, remove 120 T-38C Low-Altitude Operations in R-5601 Falcon Range with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006850
SO _x	-0.001538
NO _x	-0.001083
CO	-0.123359

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002919
PM 2.5	-0.002622
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000194
N ₂ O	-0.000038

Pollutant	Emissions Per Year (TONs)
CO ₂	-4.603343
CO ₂ e	-4.618771

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006850
SO _x	-0.001538
NO _x	-0.001083
CO	-0.123359

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002919
PM 2.5	-0.002622
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000194
N ₂ O	-0.000038

Pollutant	Emissions Per Year (TONs)
CO ₂	-4.603343
CO ₂ e	-4.618771

64.2 Aircraft & Engines

64.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

64.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

64.3 Flight Operations

64.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 120
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

64.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

65. Aircraft

65.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2037, remove 4 T-38C Low-Altitude Operations in IR-103 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.002220
SO _x	-0.003167
NO _x	-0.005683
CO	-0.091730

Pollutant	Emissions Per Year (TONs)
PM 10	-0.003345
PM 2.5	-0.002990
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.002220
SO _x	-0.003167
NO _x	-0.005683
CO	-0.091730

Pollutant	Emissions Per Year (TONs)
PM 10	-0.003345
PM 2.5	-0.002990
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

65.2 Aircraft & Engines

65.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

65.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

65.3 Flight Operations

65.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

65.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

SUA ROI: Alternative 1 GHG Report (Destination Cycles)

AIR CONFORMITY APPLICABILITY MODEL REPORT GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to estimate GHG emissions associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the GHG emissions analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Greer, OK; Harmon, OK; Jackson, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Washita, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1, SUA Destination Cycle

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action's start through the action's "steady state" (SS, net gain/loss in emission stabilized and the action is fully implemented) of emissions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO₂ equivalents (CO₂e). The CO₂e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO₂. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 tons per year (ton/yr) of CO₂e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO₂e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO₂e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected steady state of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e	Threshold	Exceedance
2034	4,748	0.19965167	0.03895209	4,764	68,039	No
2035	18,732	0.78766971	0.15367454	18,795	68,039	No
2036	32,130	1.35102373	0.26358503	32,238	68,039	No
2037	32,649	1.37286042	0.26784537	32,759	68,039	No
2038 [SS Year]	32,649	1.37286042	0.26784537	32,759	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. <https://statesummaries.ncics.org/downloads/>).

State's Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2034	700,652,689	3,554,625	135,896	836,194,567
2035	700,652,689	3,554,625	135,896	836,194,567
2036	700,652,689	3,554,625	135,896	836,194,567
2037	700,652,689	3,554,625	135,896	836,194,567
2038 [SS Year]	700,652,689	3,554,625	135,896	836,194,567

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO2	CH4	N2O	CO2e
2034	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2035	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2036	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2037	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2038 [SS Year]	5,136,454,179	25,626,912	1,500,708	6,251,695,230

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact on local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where the action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO2	CH4	N2O	CO2e
2034-2038	State Total	3,503,263,447	17,773,124	679,479	4,180,972,834
2034-2038	U.S. Total	25,682,270,895	128,134,558	7,503,538	31,258,476,148
2034-2038	Action	120,909	5.084066	0.991902	121,315
Percent of State Totals		0.00345134%	0.00002861%	0.00014598%	0.00290159%
Percent of U.S. Totals		0.00047079%	0.00000397%	0.00001322%	0.00038810%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00005201%.*

* Global value based on the U.S. emitting 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, <https://www.c2es.org/content/international-emissions>).

SUA ROI: Alternative 1 ACAM Detail Report (Destination Cycles)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Greer, OK; Harmon, OK; Jackson, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Washita, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1, SUA Destination Cycle

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite

repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Destination Cycles (IR-103)
3.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-158)
4.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-159)
5.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1141)
6.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1142)
7.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1143)
8.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1146)
9.	Aircraft	2034: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
10.	Aircraft	2034: Add T-7A MOA Destination Cycles (Hollis MOA)
11.	Aircraft	2034: Add T-7A MOA Destination Cycles (Westover 1 MOA)
12.	Aircraft	2034: Add T-7A MOA Destination Cycles (Westover 2 MOA)
13.	Aircraft	2034: Add T-7A MOA Destination Cycles (Washita MOA)
14.	Aircraft	2034: Remove T-38C MTR Destination Cycles (IR-103)
15.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-158)
16.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-159)
17.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1141)
18.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1142)
19.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1143)
20.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1146)
21.	Aircraft	2034: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
22.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Hollis MOA)
23.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
24.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
25.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Washita MOA)
26.	Aircraft	2035: Add T-7A MTR Destination Cycles (IR-103)
27.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-158)
28.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-159)
29.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1141)
30.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1142)
31.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1143)
32.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1146)
33.	Aircraft	2035: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
34.	Aircraft	2035: Add T-7A MOA Destination Cycles (Hollis MOA)
35.	Aircraft	2035: Add T-7A MOA Destination Cycles (Westover 1 MOA)
36.	Aircraft	2035: Add T-7A MOA Destination Cycles (Westover 2MOA)
37.	Aircraft	2035: Add T-7A MOA Destination Cycles (Washita MOA)
38.	Aircraft	2035: Remove T-38C MTR Destination Cycles (IR-103)
39.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-158)
40.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-159)
41.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1141)
42.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1142)

EIS for T-7A Recapitalization at Sheppard AFB, Texas
AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Activity Type		Activity Title
43.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1143)
44.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1146)
45.	Aircraft	2035: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
46.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Hollis MOA)
47.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
48.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
49.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Washita MOA)
50.	Aircraft	2036: Add T-7A MTR Destination Cycles (IR-103)
51.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-158)
52.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-159)
53.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1141)
54.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1142)
55.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1143)
56.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1146)
57.	Aircraft	2036: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
58.	Aircraft	2036: Add T-7A MOA Destination Cycles (Hollis MOA)
59.	Aircraft	2036: Add T-7A MOA Destination Cycles (Westover 1 MOA)
60.	Aircraft	2036: Add T-7A MOA Destination Cycles (Westover 2 MOA)
61.	Aircraft	2036: Add T-7A MOA Destination Cycles (Washita MOA)
62.	Aircraft	2036: Remove T-38C MTR Destination Cycles (IR-103)
63.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-158)
64.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-159)
65.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1141)
66.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1142)
67.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1143)
68.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1146)
69.	Aircraft	2036: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
70.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Hollis MOA)
71.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
72.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
73.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Washita MOA)
74.	Aircraft	2037: Add T-7A MTR Destination Cycles (IR-103)
75.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-158)
76.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-159)
77.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1141)
78.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1142)
79.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1143)
80.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1146)
81.	Aircraft	2037: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
82.	Aircraft	2037: Add T-7A MOA Destination Cycles (Hollis MOA)
83.	Aircraft	2037: Add T-7A MOA Destination Cycles (Westover 1 MOA)
84.	Aircraft	2037: Add T-7A MOA Destination Cycles (Westover 2 MOA)
85.	Aircraft	2037: Add T-7A MOA Destination Cycles (Washita MOA)
86.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-158)
87.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-159)
88.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1141)
89.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1142)
90.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1143)
91.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1146)
92.	Aircraft	2037: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
93.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Hollis MOA)
94.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
95.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
96.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Washita MOA)
97.	Aircraft	2037: Remove T-38C MTR Destination Cycles (IR-103)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2034, add 3 T-7A Destination Cycles in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	3
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2034, add 4 T-7A Destination Cycles in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 4
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MTR Destination Cycles (VR-159)

- **Activity Description:**

In 2034, add 51 T-7A Destination Cycles in VR-159 with 28 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2034

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	51
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2034, add 5 T-7A Destination Cycles in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 5
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2034, add 6 T-7A Destination Cycles in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 6
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2034, add 31 T-7A Destination Cycles in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	31
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2034, add 11 T-7A Destination Cycles in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004747
N ₂ O	0.000926

Pollutant	Emissions Per Year (TONs)
CO ₂	112.892055
CO ₂ e	113.270394

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004747
N ₂ O	0.000926

Pollutant	Emissions Per Year (TONs)
CO ₂	112.892055
CO ₂ e	113.270394

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 11
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 38
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2034, add 252 T-7A Destination Cycles in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001125
N ₂ O	0.000220

Pollutant	Emissions Per Year (TONs)
CO ₂	26.759686
CO ₂ e	26.849367

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001125
N ₂ O	0.000220

Pollutant	Emissions Per Year (TONs)
CO ₂	26.759686
CO ₂ e	26.849367

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	252
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2034, add 17 T-7A Destination Cycles in Hollis MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002662
N ₂ O	0.000519

Pollutant	Emissions Per Year (TONs)
CO ₂	63.299814
CO ₂ e	63.511953

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002662
N ₂ O	0.000519

Pollutant	Emissions Per Year (TONs)
CO ₂	63.299814
CO ₂ e	63.511953

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

10.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 17
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2034, add 929 T-7A Destination Cycles in Westover 1 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174543
N ₂ O	0.034053

Pollutant	Emissions Per Year (TONs)
CO ₂	4150.978406
CO ₂ e	4164.889724

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174543
N ₂ O	0.034053

Pollutant	Emissions Per Year (TONs)
CO ₂	4150.978406
CO ₂ e	4164.889724

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

11.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 929
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 5.4
Takeoff [Military] (mins): 7.2
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

11.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2034, add 237 T-7A Destination Cycles in Westover 2 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.046024
N ₂ O	0.008979

Pollutant	Emissions Per Year (TONs)
CO ₂	1094.534097
CO ₂ e	1098.202247

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.046024
N ₂ O	0.008979

Pollutant	Emissions Per Year (TONs)
CO ₂	1094.534097
CO ₂ e	1098.202247

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

12.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	237
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

12.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2034, add 467 T-7A Destination Cycles in Washita MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.085977
N ₂ O	0.016774

Pollutant	Emissions Per Year (TONs)
CO ₂	2044.698023
CO ₂ e	2051.550491

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.085977
N ₂ O	0.016774

Pollutant	Emissions Per Year (TONs)
CO ₂	2044.698023
CO ₂ e	2051.550491

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

13.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 467
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 7.5
 Climb Out [Intermediate] (mins): 10
 Takeoff [Military] (mins): 7.5
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

13.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2034, remove 3 T-38C Destination Cycles in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

14.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	3
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

14.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2034, remove 4 T-38C Destination Cycles in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

15.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 4
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

15.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

16. Aircraft

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2034, remove 45 T-38C Destination Cycles in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

16.2 Aircraft & Engines

16.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

16.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

16.3 Flight Operations

16.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131

Flight Operation Cycle Type: DC (Destination Cycle)

Number of Annual Flight Operation Cycles for all Aircraft: 45

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0

Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins): 34

Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0

Approach (mins): 0

Intermediate (mins): 0

Military (mins): 0

Afterburn (mins): 0

16.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

17. Aircraft

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2034, remove 4 T-38C Destination Cycles in VR-1141 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

17.2 Aircraft & Engines

17.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

17.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

17.3 Flight Operations

17.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

17.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2034, remove 5 T-38C Destination Cycles in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

18.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 5
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

18.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2034, remove 27 T-38C Destination Cycles in VR-1143 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

19.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

19.3 Flight Operations

19.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	27
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

19.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

20. Aircraft

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2034, remove 10 T-38C Destination Cycles in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001894
N ₂ O	-0.000369

Pollutant	Emissions Per Year (TONs)
CO ₂	-45.040366
CO ₂ e	-45.191312

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001894
N ₂ O	-0.000369

Pollutant	Emissions Per Year (TONs)
CO ₂	-45.040366
CO ₂ e	-45.191312

20.2 Aircraft & Engines

20.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

20.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

20.3 Flight Operations

20.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	10
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

20.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

21. Aircraft

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2034, remove 220 T-38C Destination Cycles in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000355
N ₂ O	-0.000069

Pollutant	Emissions Per Year (TONs)
CO ₂	-8.439463
CO ₂ e	-8.467746

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000355
N ₂ O	-0.000069

Pollutant	Emissions Per Year (TONs)
CO ₂	-8.439463
CO ₂ e	-8.467746

21.2 Aircraft & Engines

21.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

21.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

21.3 Flight Operations

21.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 220
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

21.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

22. Aircraft

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX;
Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2034, remove 15 T-38C Destination Cycles in Hollis MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001057
N ₂ O	-0.000206

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.139396
CO ₂ e	-25.223646

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001057
N ₂ O	-0.000206

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.139396
CO ₂ e	-25.223646

22.2 Aircraft & Engines

22.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

22.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

22.3 Flight Operations

22.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

22.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

23. Aircraft

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2034, remove 813 T-38C Destination Cycles in Westover 1 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.068752
N ₂ O	-0.013414

Pollutant	Emissions Per Year (TONs)
CO ₂	-1635.066305
CO ₂ e	-1640.545959

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.068752
N ₂ O	-0.013414

Pollutant	Emissions Per Year (TONs)
CO ₂	-1635.066305
CO ₂ e	-1640.545959

23.2 Aircraft & Engines

23.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

23.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

23.3 Flight Operations

23.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 813
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

23.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2034, remove 208 T-38C Destination Cycles in Westover 2 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.018590
N ₂ O	-0.003627

Pollutant	Emissions Per Year (TONs)
CO ₂	-442.107011
CO ₂ e	-443.588659

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.018590
N ₂ O	-0.003627

Pollutant	Emissions Per Year (TONs)
CO ₂	-442.107011
CO ₂ e	-443.588659

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	208
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2034, remove 409 T-38C Destination Cycles in Washita MOA with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000

Pollutant	Emissions Per Year (TONs)
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.029490
N ₂ O	-0.005754

Pollutant	Emissions Per Year (TONs)
CO ₂	-701.342867
CO ₂ e	-703.693302

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.029490
N ₂ O	-0.005754

Pollutant	Emissions Per Year (TONs)
CO ₂	-701.342867
CO ₂ e	-703.693302

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 409
 Number of Annual Trim Test(s) per Aircraft: 0

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- **Trim Test**

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

25.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for Flight Operation Cycles per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Flight Operation Cycles per Year**

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for Trim per Year**

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Trim per Year**

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
 AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2035, add 13 T-7A Destination Cycles in IR-103 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	13
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2035, add 17 T-7A Destination Cycles in VR-158 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006757
N ₂ O	0.001318

Pollutant	Emissions Per Year (TONs)
CO ₂	160.695629
CO ₂ e	161.234174

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006757
N ₂ O	0.001318

Pollutant	Emissions Per Year (TONs)
CO ₂	160.695629
CO ₂ e	161.234174

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 17
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2035: Add T-7A MTR Destination Cycles (VR-159)

- **Activity Description:**

In 2035, add 196 T-7A Destination Cycles in VR-159 with 76 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2035

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	196
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2035, add 19 T-7A Destination Cycles in VR-1141 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 19
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2035, add 24 T-7A Destination Cycles in VR-1142 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 24
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2035, add 120 T-7A Destination Cycles in VR-1143 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	120
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2035, add 43 T-7A Destination Cycles in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018556
N ₂ O	0.003620

Pollutant	Emissions Per Year (TONs)
CO ₂	441.305307
CO ₂ e	442.784269

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018556
N ₂ O	0.003620

Pollutant	Emissions Per Year (TONs)
CO ₂	441.305307
CO ₂ e	442.784269

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 43
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 38
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2035, add 965 T-7A Destination Cycles in R-5601 Falcon Range with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004309
N ₂ O	0.000841

Pollutant	Emissions Per Year (TONs)
CO ₂	102.472608
CO ₂ e	102.816028

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004309
N ₂ O	0.000841

Pollutant	Emissions Per Year (TONs)
CO ₂	102.472608
CO ₂ e	102.816028

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	965
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2035, add 65 T-7A Destination Cycles in Hollis MOA with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010177
N ₂ O	0.001986

Pollutant	Emissions Per Year (TONs)
CO ₂	242.028701
CO ₂ e	242.839821

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010177
N ₂ O	0.001986

Pollutant	Emissions Per Year (TONs)
CO ₂	242.028701
CO ₂ e	242.839821

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 65
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2035, add 3,560 T-7A Destination Cycles in Westover 1 MOA with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668861
N ₂ O	0.130495

Pollutant	Emissions Per Year (TONs)
CO ₂	15906.870964
CO ₂ e	15960.180214

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668861
N ₂ O	0.130495

Pollutant	Emissions Per Year (TONs)
CO ₂	15906.870964
CO ₂ e	15960.180214

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 3,560
Number of Annual Trim Test(s) per Aircraft: 0

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- **Trim Test**

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

35.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for Flight Operation Cycles per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Flight Operation Cycles per Year**

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for Trim per Year**

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Westover 2MOA)

- Activity Description:

In 2035, add 909 T-7A Destination Cycles in Westover 2 MOA with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.176521
N ₂ O	0.034439

Pollutant	Emissions Per Year (TONs)
CO ₂	4198.023181
CO ₂ e	4212.092162

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.176521
N ₂ O	0.034439

Pollutant	Emissions Per Year (TONs)
CO ₂	4198.023181
CO ₂ e	4212.092162

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 909
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1.000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2035, add 1,790 T-7A Destination Cycles in Washita MOA with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.329546
N ₂ O	0.064295

Pollutant	Emissions Per Year (TONs)
CO ₂	7837.279361
CO ₂ e	7863.544709

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.329546
N ₂ O	0.064295

Pollutant	Emissions Per Year (TONs)
CO ₂	7837.279361
CO ₂ e	7863.544709

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 1,790
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 7.5
 Climb Out [Intermediate] (mins): 10
 Takeoff [Military] (mins): 7.5
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2035, remove 14 T-38C Destination Cycles in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	14
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2035, remove 19 T-38C Destination Cycles in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003314
N ₂ O	-0.000647

Pollutant	Emissions Per Year (TONs)
CO ₂	-78.820641
CO ₂ e	-79.084796

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003314
N ₂ O	-0.000647

Pollutant	Emissions Per Year (TONs)
CO ₂	-78.820641
CO ₂ e	-79.084796

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	19
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

40. Aircraft

40.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2035, remove 224 T-38C Destination Cycles in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

40.2 Aircraft & Engines

40.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

40.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

40.3 Flight Operations

40.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 224
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

40.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

41. Aircraft

41.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2035, remove 22 T-38C Destination Cycles in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

41.2 Aircraft & Engines

41.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

41.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

41.3 Flight Operations

41.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	22
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

41.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

42. Aircraft

42.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2035, remove 27 T-38C Destination Cycles in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

42.2 Aircraft & Engines

42.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

42.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

42.3 Flight Operations

42.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	27
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

42.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

43. Aircraft

43.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2035, remove 137 T-38C Destination Cycles in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

43.2 Aircraft & Engines

43.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

43.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

43.3 Flight Operations

43.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 137
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 41
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

43.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

44. Aircraft

44.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2035, remove 49 T-38C Destination Cycles in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009280
N ₂ O	-0.001811

Pollutant	Emissions Per Year (TONs)
CO ₂	-220.697795
CO ₂ e	-221.437428

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009280
N ₂ O	-0.001811

Pollutant	Emissions Per Year (TONs)
CO ₂	-220.697795
CO ₂ e	-221.437428

44.2 Aircraft & Engines

44.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

44.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

44.3 Flight Operations

44.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	49
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

44.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

45. Aircraft

45.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2035, remove 1,102 T-38C Destination Cycles in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001778
N ₂ O	-0.000347

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.274036
CO ₂ e	-42.415710

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001778
N ₂ O	-0.000347

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.274036
CO ₂ e	-42.415710

45.2 Aircraft & Engines

45.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

45.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

45.3 Flight Operations

45.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,102
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

45.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

46. Aircraft

46.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2035, remove 74 T-38C Destination Cycles in Hollis MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005215
N ₂ O	-0.001017

Pollutant	Emissions Per Year (TONs)
CO ₂	-124.021019
CO ₂ e	-124.436655

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005215
N ₂ O	-0.001017

Pollutant	Emissions Per Year (TONs)
CO ₂	-124.021019
CO ₂ e	-124.436655

46.2 Aircraft & Engines

46.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

46.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

46.3 Flight Operations

46.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 74
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

46.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

47. Aircraft

47.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2035, remove 4,063 T-38C Destination Cycles in Westover 1 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.343592
N ₂ O	-0.067035

Pollutant	Emissions Per Year (TONs)
CO ₂	-8171.309221
CO ₂ e	-8198.694014

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.343592
N ₂ O	-0.067035

Pollutant	Emissions Per Year (TONs)
CO ₂	-8171.309221
CO ₂ e	-8198.694014

47.2 Aircraft & Engines

47.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

47.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

47.3 Flight Operations

47.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4,063
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

47.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

48. Aircraft

48.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2035, remove 1,477 T-38C Destination Cycles in Westover 2 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.132007
N ₂ O	-0.025755

Pollutant	Emissions Per Year (TONs)
CO ₂	-3139.384879
CO ₂ e	-3149.906009

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.132007
N ₂ O	-0.025755

Pollutant	Emissions Per Year (TONs)
CO ₂	-3139.384879
CO ₂ e	-3149.906009

48.2 Aircraft & Engines

48.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

48.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

48.3 Flight Operations

48.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,477
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

48.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

49. Aircraft

49.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2035, remove 2,043 T-38C Destination Cycles in Washita MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.147308
N ₂ O	-0.028740

Pollutant	Emissions Per Year (TONs)
CO ₂	-3503.284787
CO ₂ e	-3515.025467

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.147308
N ₂ O	-0.028740

Pollutant	Emissions Per Year (TONs)
CO ₂	-3503.284787
CO ₂ e	-3515.025467

49.2 Aircraft & Engines

49.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

49.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

49.3 Flight Operations

49.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 2,043
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 7.5
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 7.5
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

49.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

50. Aircraft

50.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2036, add 12 T-7A Destination Cycles in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002726
N ₂ O	0.000532

Pollutant	Emissions Per Year (TONs)
CO ₂	64.818405
CO ₂ e	65.035633

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002726
N ₂ O	0.000532

Pollutant	Emissions Per Year (TONs)
CO ₂	64.818405
CO ₂ e	65.035633

50.2 Aircraft & Engines

50.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

50.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

50.3 Flight Operations

50.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	12
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

50.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

51. Aircraft

51.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2036, add 16 T-7A Destination Cycles in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

51.2 Aircraft & Engines

51.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

51.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

51.3 Flight Operations

51.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 16
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

51.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

52. Aircraft

52.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2036, add 183 T-7A Destination Cycles in VR-159 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070659
N ₂ O	0.013786

Pollutant	Emissions Per Year (TONs)
CO ₂	1680.417149
CO ₂ e	1686.048789

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070659
N ₂ O	0.013786

Pollutant	Emissions Per Year (TONs)
CO ₂	1680.417149
CO ₂ e	1686.048789

52.2 Aircraft & Engines

52.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

52.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

52.3 Flight Operations

52.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 183
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

52.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

53. Aircraft

53.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2036, add 18 T-7A Destination Cycles in VR-1141 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007359
N ₂ O	0.001436

Pollutant	Emissions Per Year (TONs)
CO ₂	175.009693
CO ₂ e	175.596209

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007359
N ₂ O	0.001436

Pollutant	Emissions Per Year (TONs)
CO ₂	175.009693
CO ₂ e	175.596209

53.2 Aircraft & Engines

53.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

53.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

53.3 Flight Operations

53.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	18
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

53.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

54. Aircraft

54.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2036, add 22 T-7A Destination Cycles in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008994
N ₂ O	0.001755

Pollutant	Emissions Per Year (TONs)
CO ₂	213.900736
CO ₂ e	214.617589

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008994
N ₂ O	0.001755

Pollutant	Emissions Per Year (TONs)
CO ₂	213.900736
CO ₂ e	214.617589

54.2 Aircraft & Engines

54.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

54.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

54.3 Flight Operations

54.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 22
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

54.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

55. Aircraft

55.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Destination Cycles (VR-1143)

- **Activity Description:**

In 2036, add 113 T-7A Destination Cycles in VR-1143 with 108 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2036

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.052614
N ₂ O	0.010265

Pollutant	Emissions Per Year (TONs)
CO ₂	1251.265292
CO ₂ e	1255.458701

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.052614
N ₂ O	0.010265

Pollutant	Emissions Per Year (TONs)
CO ₂	1251.265292
CO ₂ e	1255.458701

55.2 Aircraft & Engines

55.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

55.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

55.3 Flight Operations

55.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	113
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

55.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

56. Aircraft

56.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2036, add 40 T-7A Destination Cycles in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

56.2 Aircraft & Engines

56.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

56.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

56.3 Flight Operations

56.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 40
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

56.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

57. Aircraft

57.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2036, add 902 T-7A Destination Cycles in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004028
N ₂ O	0.000786

Pollutant	Emissions Per Year (TONs)
CO ₂	95.782686
CO ₂ e	96.103686

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004028
N ₂ O	0.000786

Pollutant	Emissions Per Year (TONs)
CO ₂	95.782686
CO ₂ e	96.103686

57.2 Aircraft & Engines

57.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

57.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

57.3 Flight Operations

57.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 902
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

57.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

58. Aircraft

58.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2036, add 60 T-7A Destination Cycles in Hollis MOA with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009394
N ₂ O	0.001833

Pollutant	Emissions Per Year (TONs)
CO ₂	223.411109
CO ₂ e	224.159834

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009394
N ₂ O	0.001833

Pollutant	Emissions Per Year (TONs)
CO ₂	223.411109
CO ₂ e	224.159834

58.2 Aircraft & Engines

58.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

58.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

58.3 Flight Operations

58.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	60
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

58.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

59. Aircraft

59.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2036, add 3,327 T-7A Destination Cycles in Westover 1 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.625084
N ₂ O	0.121954

Pollutant	Emissions Per Year (TONs)
CO ₂	14865.775196
CO ₂ e	14915.595385

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.625084
N ₂ O	0.121954

Pollutant	Emissions Per Year (TONs)
CO ₂	14865.775196
CO ₂ e	14915.595385

59.2 Aircraft & Engines

59.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

59.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

59.3 Flight Operations

59.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 3,327
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 23.4
 Climb Out [Intermediate] (mins): 5.4
 Takeoff [Military] (mins): 7.2
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

59.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

60. Aircraft

60.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2036, add 850 T-7A Destination Cycles in Westover 2 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.165063
N ₂ O	0.032204

Pollutant	Emissions Per Year (TONs)
CO ₂	3925.544228
CO ₂ e	3938.700042

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.165063
N ₂ O	0.032204

Pollutant	Emissions Per Year (TONs)
CO ₂	3925.544228
CO ₂ e	3938.700042

60.2 Aircraft & Engines

60.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

60.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

60.3 Flight Operations

60.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	850
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

60.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

61. Aircraft

61.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2036, add 1,673 T-7A Destination Cycles in Washita MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.308006
N ₂ O	0.060092

Pollutant	Emissions Per Year (TONs)
CO ₂	7325.010263
CO ₂ e	7349.558825

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.308006
N ₂ O	0.060092

Pollutant	Emissions Per Year (TONs)
CO ₂	7325.010263
CO ₂ e	7349.558825

61.2 Aircraft & Engines

61.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

61.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

61.3 Flight Operations

61.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,673
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 7.5
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 7.5
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

61.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

62. Aircraft

62.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2036, remove 15 T-38C Destination Cycles in IR-103 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

62.2 Aircraft & Engines

62.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

62.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

62.3 Flight Operations

62.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

62.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

63. Aircraft

63.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2036, remove 20 T-38C Destination Cycles in VR-158 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003489
N ₂ O	-0.000681

Pollutant	Emissions Per Year (TONs)
CO ₂	-82.969096
CO ₂ e	-83.247153

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003489
N ₂ O	-0.000681

Pollutant	Emissions Per Year (TONs)
CO ₂	-82.969096
CO ₂ e	-83.247153

63.2 Aircraft & Engines

63.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

63.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

63.3 Flight Operations

63.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 20
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

63.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

64. Aircraft

64.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2036, remove 229 T-38C Destination Cycles in VR-159 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

64.2 Aircraft & Engines

64.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

64.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

64.3 Flight Operations

64.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	229
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

64.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

65. Aircraft

65.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2036, remove 23 T-38C Destination Cycles in VR-1141 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004127
N ₂ O	-0.000805

Pollutant	Emissions Per Year (TONs)
CO ₂	-98.140588
CO ₂ e	-98.469490

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004127
N ₂ O	-0.000805

Pollutant	Emissions Per Year (TONs)
CO ₂	-98.140588
CO ₂ e	-98.469490

65.2 Aircraft & Engines

65.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

65.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

65.3 Flight Operations

65.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	23
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

65.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

66. Aircraft

66.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2036, remove 28 T-38C Destination Cycles in VR-1142 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

66.2 Aircraft & Engines

66.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

66.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

66.3 Flight Operations

66.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 28
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

66.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

67. Aircraft

67.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2036, remove 141 T-38C Destination Cycles in VR-1143 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

67.2 Aircraft & Engines

67.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

67.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

67.3 Flight Operations

67.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	141
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

67.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

68. Aircraft

68.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2036, remove 50 T-38C Destination Cycles in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009469
N ₂ O	-0.001847

Pollutant	Emissions Per Year (TONs)
CO ₂	-225.201832
CO ₂ e	-225.956559

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009469
N ₂ O	-0.001847

Pollutant	Emissions Per Year (TONs)
CO ₂	-225.201832
CO ₂ e	-225.956559

68.2 Aircraft & Engines

68.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

68.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

68.3 Flight Operations

68.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	50
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

68.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

69. Aircraft

69.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2036, remove 1,128 T-38C Destination Cycles in R-5601 Falcon Range with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001820
N ₂ O	-0.000355

Pollutant	Emissions Per Year (TONs)
CO ₂	-43.271427
CO ₂ e	-43.416444

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001820
N ₂ O	-0.000355

Pollutant	Emissions Per Year (TONs)
CO ₂	-43.271427
CO ₂ e	-43.416444

69.2 Aircraft & Engines

69.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

69.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

69.3 Flight Operations

69.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,128
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

69.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

70. Aircraft

70.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX;
Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2036, remove 75 T-38C Destination Cycles in Hollis MOA with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005285
N ₂ O	-0.001031

Pollutant	Emissions Per Year (TONs)
CO ₂	-125.696979
CO ₂ e	-126.118232

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005285
N ₂ O	-0.001031

Pollutant	Emissions Per Year (TONs)
CO ₂	-125.696979
CO ₂ e	-126.118232

70.2 Aircraft & Engines

70.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

70.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

70.3 Flight Operations

70.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	75
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

70.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

71. Aircraft

71.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2036, remove 4,159 T-38C Destination Cycles in Westover 1 MOA with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.351710
N ₂ O	-0.068619

Pollutant	Emissions Per Year (TONs)
CO ₂	-8364.379781
CO ₂ e	-8392.411618

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.351710
N ₂ O	-0.068619

Pollutant	Emissions Per Year (TONs)
CO ₂	-8364.379781
CO ₂ e	-8392.411618

71.2 Aircraft & Engines

71.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

71.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

71.3 Flight Operations

71.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 4,159
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 23.4
 Climb Out [Intermediate] (mins): 5.4
 Takeoff [Military] (mins): 7.2
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

71.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

72. Aircraft

72.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2036, remove 623 T-38C Destination Cycles in Westover 2 MOA with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.055680
N ₂ O	-0.010863

Pollutant	Emissions Per Year (TONs)
CO ₂	-1324.195518
CO ₂ e	-1328.633340

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.055680
N ₂ O	-0.010863

Pollutant	Emissions Per Year (TONs)
CO ₂	-1324.195518
CO ₂ e	-1328.633340

72.2 Aircraft & Engines

72.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

72.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

72.3 Flight Operations

72.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56

Flight Operation Cycle Type: DC (Destination Cycle)

Number of Annual Flight Operation Cycles for all Aircraft: 623

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

72.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
 TD: Test Duration (min)
 60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1,000 pounds
 EF: Emission Factor (lb/1,000 lb fuel)
 NE: Number of Engines
 NA: Number of Aircraft
 NTT: Number of Trim Test
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

73. Aircraft

73.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2036, remove 2,092 T-38C Destination Cycles in Washita MOA with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.150841
N ₂ O	-0.029429

Pollutant	Emissions Per Year (TONs)
CO ₂	-3587.308749
CO ₂ e	-3599.331022

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.150841
N ₂ O	-0.029429

Pollutant	Emissions Per Year (TONs)
CO ₂	-3587.308749
CO ₂ e	-3599.331022

73.2 Aircraft & Engines

73.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

73.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

73.3 Flight Operations

73.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	2,092
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

73.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

74. Aircraft

74.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2037, add 2 T-7A Destination Cycles in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

74.2 Aircraft & Engines

74.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

74.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

74.3 Flight Operations

74.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 2
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

74.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

75. Aircraft

75.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2037, add 3 T-7A Destination Cycles in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001192
N ₂ O	0.000233

Pollutant	Emissions Per Year (TONs)
CO ₂	28.358052
CO ₂ e	28.453089

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001192
N ₂ O	0.000233

Pollutant	Emissions Per Year (TONs)
CO ₂	28.358052
CO ₂ e	28.453089

75.2 Aircraft & Engines

75.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

75.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

75.3 Flight Operations

75.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 3
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

75.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

76. Aircraft

76.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2037, add 30 T-7A Destination Cycles in VR-159 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011583
N ₂ O	0.002260

Pollutant	Emissions Per Year (TONs)
CO ₂	275.478221
CO ₂ e	276.401441

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011583
N ₂ O	0.002260

Pollutant	Emissions Per Year (TONs)
CO ₂	275.478221
CO ₂ e	276.401441

76.2 Aircraft & Engines

76.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

76.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

76.3 Flight Operations

76.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	30
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

76.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

77. Aircraft

77.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2037, add 3 T-7A Destination Cycles in VR-1141 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001226
N ₂ O	0.000239

Pollutant	Emissions Per Year (TONs)
CO ₂	29.168282
CO ₂ e	29.266035

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001226
N ₂ O	0.000239

Pollutant	Emissions Per Year (TONs)
CO ₂	29.168282
CO ₂ e	29.266035

77.2 Aircraft & Engines

77.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

77.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

77.3 Flight Operations

77.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 3
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

77.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

78. Aircraft

78.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2037, add 4 T-7A Destination Cycles in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

78.2 Aircraft & Engines

78.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

78.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

78.3 Flight Operations

78.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

78.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

79. Aircraft

79.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2037, add 18 T-7A Destination Cycles in VR-1143 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008381
N ₂ O	0.001635

Pollutant	Emissions Per Year (TONs)
CO ₂	199.316595
CO ₂ e	199.984572

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008381
N ₂ O	0.001635

Pollutant	Emissions Per Year (TONs)
CO ₂	199.316595
CO ₂ e	199.984572

79.2 Aircraft & Engines

79.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

79.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

79.3 Flight Operations

79.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 18
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

79.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

80. Aircraft

80.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2037, add 7 T-7A Destination Cycles in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003021
N ₂ O	0.000589

Pollutant	Emissions Per Year (TONs)
CO ₂	71.840399
CO ₂ e	72.081160

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003021
N ₂ O	0.000589

Pollutant	Emissions Per Year (TONs)
CO ₂	71.840399
CO ₂ e	72.081160

80.2 Aircraft & Engines

80.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

80.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

80.3 Flight Operations

80.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 7
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

80.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 604) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

81. Aircraft

81.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2037, add 59 T-7A Destination Cycles in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000656
N ₂ O	0.000128

Pollutant	Emissions Per Year (TONs)
CO ₂	15.609817
CO ₂ e	15.662131

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000656
N ₂ O	0.000128

Pollutant	Emissions Per Year (TONs)
CO ₂	15.609817
CO ₂ e	15.662131

81.2 Aircraft & Engines

81.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

81.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

81.3 Flight Operations

81.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108

Flight Operation Cycle Type: DC (Destination Cycle)

Number of Annual Flight Operation Cycles for all Aircraft: 147

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0

Approach [Approach] (mins): 0.4

Climb Out [Intermediate] (mins): 0.43

Takeoff [Military] (mins): 0

Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0

Approach (mins): 0

Intermediate (mins): 0

Military (mins): 0

Afterburn (mins): 0

81.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

82. Aircraft

82.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2037, add 10 T-7A Destination Cycles in Hollis MOA with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001566
N ₂ O	0.000305

Pollutant	Emissions Per Year (TONs)
CO ₂	37.235185
CO ₂ e	37.359972

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001566
N ₂ O	0.000305

Pollutant	Emissions Per Year (TONs)
CO ₂	37.235185
CO ₂ e	37.359972

82.2 Aircraft & Engines

82.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

82.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

82.3 Flight Operations

82.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 10
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 19.5
 Climb Out [Intermediate] (mins): 4.5
 Takeoff [Military] (mins): 6
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

82.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

83. Aircraft

83.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2037, add 542 T-7A Destination Cycles in Westover 1 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.101832
N ₂ O	0.019867

Pollutant	Emissions Per Year (TONs)
CO ₂	2421.776422
CO ₂ e	2429.892606

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.101832
N ₂ O	0.019867

Pollutant	Emissions Per Year (TONs)
CO ₂	2421.776422
CO ₂ e	2429.892606

83.2 Aircraft & Engines

83.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

83.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

83.3 Flight Operations

83.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	542
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

83.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

84. Aircraft

84.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2037, add 138 T-7A Destination Cycles in Westover 2 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.026799
N ₂ O	0.005228

Pollutant	Emissions Per Year (TONs)
CO ₂	637.323651
CO ₂ e	639.459536

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.026799
N ₂ O	0.005228

Pollutant	Emissions Per Year (TONs)
CO ₂	637.323651
CO ₂ e	639.459536

84.2 Aircraft & Engines

84.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

84.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

84.3 Flight Operations

84.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 138
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

84.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

85. Aircraft

85.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2037, add 272 T-7A Destination Cycles in Washita MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.050076
N ₂ O	0.009770

Pollutant	Emissions Per Year (TONs)
CO ₂	1190.916193
CO ₂ e	1194.907352

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.050076
N ₂ O	0.009770

Pollutant	Emissions Per Year (TONs)
CO ₂	1190.916193
CO ₂ e	1194.907352

85.2 Aircraft & Engines

85.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

85.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

85.3 Flight Operations

85.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 272
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 7.5
 Climb Out [Intermediate] (mins): 10
 Takeoff [Military] (mins): 7.5
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

85.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

86. Aircraft

86.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2037, remove 5 T-38C Destination Cycles in VR-158 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

86.2 Aircraft & Engines

86.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

86.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

86.3 Flight Operations

86.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

86.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

87. Aircraft

87.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2037, remove 61 T-38C Destination Cycles in VR-159 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

87.2 Aircraft & Engines

87.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

87.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

87.3 Flight Operations

87.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	61
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

87.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

88. Aircraft

88.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2037, remove 6 T-38C Destination Cycles in VR-1141 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

88.2 Aircraft & Engines

88.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

88.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

88.3 Flight Operations

88.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 6
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

88.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

89. Aircraft

89.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2037, remove 7 T-38C Destination Cycles in VR-1142 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

89.2 Aircraft & Engines

89.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

89.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

89.3 Flight Operations

89.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	7
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

89.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

90. Aircraft

90.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2037, remove 37 T-38C Destination Cycles in VR-1143 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

90.2 Aircraft & Engines

90.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

90.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

90.3 Flight Operations

90.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	37
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

90.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

91. Aircraft

91.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2037, remove 13 T-38C Destination Cycles in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002462
N ₂ O	-0.000480

Pollutant	Emissions Per Year (TONs)
CO ₂	-58.552476
CO ₂ e	-58.748705

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002462
N ₂ O	-0.000480

Pollutant	Emissions Per Year (TONs)
CO ₂	-58.552476
CO ₂ e	-58.748705

91.2 Aircraft & Engines

91.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

91.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

91.3 Flight Operations

91.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 13
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

91.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

92. Aircraft

92.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2037, remove 299 T-38C Destination Cycles in R-5601 Falcon Range with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000482
N ₂ O	-0.000094

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.469997
CO ₂ e	-11.508437

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000482
N ₂ O	-0.000094

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.469997
CO ₂ e	-11.508437

92.2 Aircraft & Engines

92.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

92.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

92.3 Flight Operations

92.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	299
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

92.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

93. Aircraft

93.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2037, remove 20 T-38C Destination Cycles in Hollis MOA with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001409
N ₂ O	-0.000275

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.519194
CO ₂ e	-33.631528

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001409
N ₂ O	-0.000275

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.519194
CO ₂ e	-33.631528

93.2 Aircraft & Engines

93.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

93.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

93.3 Flight Operations

93.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	20
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

93.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

94. Aircraft

94.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2037, remove 1,103 T-38C Destination Cycles in Westover 1 MOA with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.093276
N ₂ O	-0.018198

Pollutant	Emissions Per Year (TONs)
CO ₂	-2218.300288
CO ₂ e	-2225.734555

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.093276
N ₂ O	-0.018198

Pollutant	Emissions Per Year (TONs)
CO ₂	-2218.300288
CO ₂ e	-2225.734555

94.2 Aircraft & Engines

94.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

94.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

94.3 Flight Operations

94.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,103
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 5.4
Takeoff [Military] (mins): 7.2
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

94.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

95. Aircraft

95.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2037, remove 282 T-38C Destination Cycles in Westover 2 MOA with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.025204
N ₂ O	-0.004917

Pollutant	Emissions Per Year (TONs)
CO ₂	-599.395082
CO ₂ e	-601.403855

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.025204
N ₂ O	-0.004917

Pollutant	Emissions Per Year (TONs)
CO ₂	-599.395082
CO ₂ e	-601.403855

95.2 Aircraft & Engines

95.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

95.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

95.3 Flight Operations

95.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	282
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

95.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

96. Aircraft

96.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2037, remove 555 T-38C Destination Cycles in Washita MOA with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.040018
N ₂ O	-0.007807

Pollutant	Emissions Per Year (TONs)
CO ₂	-951.699979
CO ₂ e	-954.889444

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.040018
N ₂ O	-0.007807

Pollutant	Emissions Per Year (TONs)
CO ₂	-951.699979
CO ₂ e	-954.889444

96.2 Aircraft & Engines

96.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

96.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

96.3 Flight Operations

96.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 555
 Number of Annual Trim Test(s) per Aircraft: 0

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- **Trim Test**

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

96.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for Flight Operation Cycles per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Flight Operation Cycles per Year**

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for Trim per Year**

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

97. Aircraft

97.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2037, remove 4 T-38C Destination Cycles in IR-103 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

97.2 Aircraft & Engines

97.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

97.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

97.3 Flight Operations

97.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 4
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

97.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

SUA ROI: Alternative 2 ACAM Report (Low Flight Patterns)

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2, SUA Low Flight Pattern

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

_____ applicable
 X not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving “steady state” (i.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts on local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact on air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (i.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2034

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.163	250	No
NOx	14.516	250	No
CO	8.532	250	No
SOx	0.721	250	No
PM 10	0.348	250	No
PM 2.5	0.310	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2035

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.247	250	No
NOx	66.901	250	No
CO	-14.185	250	No
SOx	1.601	250	No
PM 10	-0.324	250	No
PM 2.5	-0.296	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2036

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	7.071	250	No
NOx	115.702	250	No
CO	-37.749	250	No
SOx	2.344	250	No
PM 10	-1.037	250	No
PM 2.5	-0.938	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2037

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	7.470	250	No
NOx	123.584	250	No
CO	-44.266	250	No
SOx	2.377	250	No
PM 10	-1.250	250	No
PM 2.5	-1.129	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	7.470	250	No
NOx	123.584	250	No
CO	-44.266	250	No
SOx	2.377	250	No
PM 10	-1.250	250	No
PM 2.5	-1.129	250	No
Pb	0.000	25	No
NH3	0.000	250	No

None of the estimated annual net emissions associated with this action are above the insignificance indicators; therefore, the action will not cause or contribute to an exceedance of one or more NAAQSs and will have an insignificant impact on air quality. No further air assessment is needed.

Carolyn Hein, Contractor

May 12, 2025

Name, Title

Date

SUA ROI: Alternative 2 ACAM Detail Report (Low Flight Patterns)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2, SUA Low Flight Pattern

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-

site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (IR-103)
3.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-158)
4.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-159)
5.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1141)
6.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1142)
7.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1143)
8.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1146)
9.	Aircraft	2034: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
10.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (IR-103)
11.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (VR-158)
12.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (VR-159)
13.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (VR-1141)
14.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (VR-1142)
15.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (VR-1143)
16.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (VR-1146)
17.	Aircraft	2034: Add T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
18.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (IR-103)
19.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-158)
20.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-159)
21.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1141)
22.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1142)
23.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1143)
24.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1146)
25.	Aircraft	2035: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
26.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (IR-103)
27.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-158)
28.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-159)
29.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1141)
30.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1142)
31.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1143)
32.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)
33.	Aircraft	2035: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
34.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (IR-103)
35.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-158)
36.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-159)
37.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1141)
38.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1142)
39.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1143)

Activity Type		Activity Title
40.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1146)
41.	Aircraft	2036: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
42.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (IR-103)
43.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-158)
44.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-159)
45.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1141)
46.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1142)
47.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1143)
48.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)
49.	Aircraft	2036: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
50.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (IR-103)
51.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-158)
52.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-159)
53.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1141)
54.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1142)
55.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1143)
56.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1146)
57.	Aircraft	2037: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
58.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-158)
59.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-159)
60.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1141)
61.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1142)
62.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1143)
63.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)
64.	Aircraft	2037: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
65.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (IR-103)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2034, add 4 T-7A Low-Altitude Operations in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.015310
SO _x	0.007217
NO _x	0.222574
CO	0.012680

Pollutant	Emissions Per Year (TONs)
PM 10	0.001079
PM 2.5	0.000944
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000909
N ₂ O	0.000177

Pollutant	Emissions Per Year (TONs)
CO ₂	21.606135
CO ₂ e	21.678544

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.015310
SO _x	0.007217
NO _x	0.222574
CO	0.012680

Pollutant	Emissions Per Year (TONs)
PM 10	0.001079
PM 2.5	0.000944
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000909
N ₂ O	0.000177

Pollutant	Emissions Per Year (TONs)
CO ₂	21.606135
CO ₂ e	21.678544

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 4
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2034, add 5 T-7A Low-Altitude Operations in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.033491
SO _x	0.015787
NO _x	0.486881
CO	0.027737

Pollutant	Emissions Per Year (TONs)
PM 10	0.002361
PM 2.5	0.002066
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001987
N ₂ O	0.000388

Pollutant	Emissions Per Year (TONs)
CO ₂	47.263420
CO ₂ e	47.421816

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.033491
SO _x	0.015787
NO _x	0.486881
CO	0.027737

Pollutant	Emissions Per Year (TONs)
PM 10	0.002361
PM 2.5	0.002066
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001987
N ₂ O	0.000388

Pollutant	Emissions Per Year (TONs)
CO ₂	47.263420
CO ₂ e	47.421816

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2034, add 64 T-7A Low-Altitude Operations in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.416443
SO _x	0.196297
NO _x	6.054013
CO	0.344895

Pollutant	Emissions Per Year (TONs)
PM 10	0.029353
PM 2.5	0.025684
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.024711
N ₂ O	0.004821

Pollutant	Emissions Per Year (TONs)
CO ₂	587.686872
CO ₂ e	589.656407

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.416443
SO _x	0.196297
NO _x	6.054013
CO	0.344895

Pollutant	Emissions Per Year (TONs)
PM 10	0.029353
PM 2.5	0.025684
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.024711
N ₂ O	0.004821

Pollutant	Emissions Per Year (TONs)
CO ₂	587.686872
CO ₂ e	589.656407

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 64
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MTR Low-Altitude Operations (VR-1141)

- **Activity Description:**

In 2034, add 6 T-7A Low-Altitude Operations in VR-1141 with 28 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2034

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.041338
SO _x	0.019485
NO _x	0.600950
CO	0.034236

Pollutant	Emissions Per Year (TONs)
PM 10	0.002914
PM 2.5	0.002549
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.041338
SO _x	0.019485
NO _x	0.600950
CO	0.034236

Pollutant	Emissions Per Year (TONs)
PM 10	0.002914
PM 2.5	0.002549
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	6
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2034, add 8 T-7A Low-Altitude Operations in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.055117
SO _x	0.025980
NO _x	0.801266
CO	0.045648

Pollutant	Emissions Per Year (TONs)
PM 10	0.003885
PM 2.5	0.003399
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003271
N ₂ O	0.000638

Pollutant	Emissions Per Year (TONs)
CO ₂	77.782086
CO ₂ e	78.042760

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.055117
SO _x	0.025980
NO _x	0.801266
CO	0.045648

Pollutant	Emissions Per Year (TONs)
PM 10	0.003885
PM 2.5	0.003399
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003271
N ₂ O	0.000638

Pollutant	Emissions Per Year (TONs)
CO ₂	77.782086
CO ₂ e	78.042760

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 8
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2034, add 39 T-7A Low-Altitude Operations in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.306016
SO _x	0.144246
NO _x	4.448698
CO	0.253441

Pollutant	Emissions Per Year (TONs)
PM 10	0.021569
PM 2.5	0.018873
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018159
N ₂ O	0.003543

Pollutant	Emissions Per Year (TONs)
CO ₂	431.852623
CO ₂ e	433.299906

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.306016
SO _x	0.144246
NO _x	4.448698
CO	0.253441

Pollutant	Emissions Per Year (TONs)
PM 10	0.021569
PM 2.5	0.018873
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018159
N ₂ O	0.003543

Pollutant	Emissions Per Year (TONs)
CO ₂	431.852623
CO ₂ e	433.299906

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 39
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 13 T-7A Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.094542
SO _x	0.044564
NO _x	1.374394
CO	0.078299

Pollutant	Emissions Per Year (TONs)
PM 10	0.006664
PM 2.5	0.005831
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005610
N ₂ O	0.001095

Pollutant	Emissions Per Year (TONs)
CO ₂	133.417884
CO ₂ e	133.865012

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.094542
SO _x	0.044564
NO _x	1.374394
CO	0.078299

Pollutant	Emissions Per Year (TONs)
PM 10	0.006664
PM 2.5	0.005831
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005610
N ₂ O	0.001095

Pollutant	Emissions Per Year (TONs)
CO ₂	133.417884
CO ₂ e	133.865012

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	13
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1,000 pounds
 EF: Emission Factor (lb/1,000 lb fuel)
 NE: Number of Engines
 NA: Number of Aircraft
 NTT: Number of Trim Test
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2034, add 127 T-7A Low-Altitude Operations in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.008098
SO _x	0.004505
NO _x	0.057529
CO	0.012771

Pollutant	Emissions Per Year (TONs)
PM 10	0.000486
PM 2.5	0.000412
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000567
N ₂ O	0.000111

Pollutant	Emissions Per Year (TONs)
CO ₂	13.486032
CO ₂ e	13.531229

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.008098
SO _x	0.004505
NO _x	0.057529
CO	0.012771

Pollutant	Emissions Per Year (TONs)
PM 10	0.000486
PM 2.5	0.000412
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000567
N ₂ O	0.000111

Pollutant	Emissions Per Year (TONs)
CO ₂	13.486032
CO ₂ e	13.531229

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 127
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2034, add 5 T-38C Low-Altitude Operations in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.002775
SO _x	0.003959
NO _x	0.007104
CO	0.114663

Pollutant	Emissions Per Year (TONs)
PM 10	0.004181
PM 2.5	0.003737
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000498
N ₂ O	0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	11.852728
CO ₂ e	11.892450

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.002775
SO _x	0.003959
NO _x	0.007104
CO	0.114663

Pollutant	Emissions Per Year (TONs)
PM 10	0.004181
PM 2.5	0.003737
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000498
N ₂ O	0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	11.852728
CO ₂ e	11.892450

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

10.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2034, add 7 T-38C Low-Altitude Operations in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.006799
SO _x	0.009700
NO _x	0.017405
CO	0.280924

Pollutant	Emissions Per Year (TONs)
PM 10	0.010243
PM 2.5	0.009156
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001221
N ₂ O	0.000238

Pollutant	Emissions Per Year (TONs)
CO ₂	29.039184
CO ₂ e	29.136504

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.006799
SO _x	0.009700
NO _x	0.017405
CO	0.280924

Pollutant	Emissions Per Year (TONs)
PM 10	0.010243
PM 2.5	0.009156
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001221
N ₂ O	0.000238

Pollutant	Emissions Per Year (TONs)
CO ₂	29.039184
CO ₂ e	29.136504

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

11.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 7
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

11.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2034, add 84 T-38C Low-Altitude Operations in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.079254
SO _x	0.113069
NO _x	0.202890
CO	3.274775

Pollutant	Emissions Per Year (TONs)
PM 10	0.119409
PM 2.5	0.106729
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014234
N ₂ O	0.002777

Pollutant	Emissions Per Year (TONs)
CO ₂	338.513912
CO ₂ e	339.648385

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.079254
SO _x	0.113069
NO _x	0.202890
CO	3.274775

Pollutant	Emissions Per Year (TONs)
PM 10	0.119409
PM 2.5	0.106729
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014234
N ₂ O	0.002777

Pollutant	Emissions Per Year (TONs)
CO ₂	338.513912
CO ₂ e	339.648385

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

12.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	84
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

12.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2034, add 8 T-38C Low-Altitude Operations in VR-1141 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.007992
SO _x	0.011402
NO _x	0.020460
CO	0.330229

Pollutant	Emissions Per Year (TONs)
PM 10	0.012041
PM 2.5	0.010763
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001435
N ₂ O	0.000280

Pollutant	Emissions Per Year (TONs)
CO ₂	34.135857
CO ₂ e	34.250257

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.007992
SO _x	0.011402
NO _x	0.020460
CO	0.330229

Pollutant	Emissions Per Year (TONs)
PM 10	0.012041
PM 2.5	0.010763
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001435
N ₂ O	0.000280

Pollutant	Emissions Per Year (TONs)
CO ₂	34.135857
CO ₂ e	34.250257

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

13.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	8
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

13.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2034, add 10 T-38C Low-Altitude Operations in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.009990
SO _x	0.014252
NO _x	0.025574
CO	0.412787

Pollutant	Emissions Per Year (TONs)
PM 10	0.015052
PM 2.5	0.013453
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001794
N ₂ O	0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	42.669821
CO ₂ e	42.812822

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.009990
SO _x	0.014252
NO _x	0.025574
CO	0.412787

Pollutant	Emissions Per Year (TONs)
PM 10	0.015052
PM 2.5	0.013453
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001794
N ₂ O	0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	42.669821
CO ₂ e	42.812822

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

14.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 10
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

14.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-38C MTR Low-Altitude Operations (VR-1143)

- **Activity Description:**

In 2034, add 51 T-38C Low-Altitude Operations in VR-1143 with 131 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2034

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.058025
SO _x	0.082783
NO _x	0.148545
CO	2.397603

Pollutant	Emissions Per Year (TONs)
PM 10	0.087425
PM 2.5	0.078141
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010421
N ₂ O	0.002033

Pollutant	Emissions Per Year (TONs)
CO ₂	247.840542
CO ₂ e	248.671139

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.058025
SO _x	0.082783
NO _x	0.148545
CO	2.397603

Pollutant	Emissions Per Year (TONs)
PM 10	0.087425
PM 2.5	0.078141
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010421
N ₂ O	0.002033

Pollutant	Emissions Per Year (TONs)
CO ₂	247.840542
CO ₂ e	248.671139

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

15.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	51
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

15.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

16. Aircraft

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Add T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 17 T-38C Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.017927
SO _x	0.025575
NO _x	0.045892
CO	0.740723

Pollutant	Emissions Per Year (TONs)
PM 10	0.027009
PM 2.5	0.024141
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003220
N ₂ O	0.000628

Pollutant	Emissions Per Year (TONs)
CO ₂	76.568623
CO ₂ e	76.825230

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.017927
SO _x	0.025575
NO _x	0.045892
CO	0.740723

Pollutant	Emissions Per Year (TONs)
PM 10	0.027009
PM 2.5	0.024141
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003220
N ₂ O	0.000628

Pollutant	Emissions Per Year (TONs)
CO ₂	76.568623
CO ₂ e	76.825230

16.2 Aircraft & Engines

16.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

16.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

16.3 Flight Operations

16.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 17
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 38
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

16.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

17. Aircraft

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2034, add 166 T-38C Low-Altitude Operations in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.009476
SO _x	0.002127
NO _x	0.001498
CO	0.170646

Pollutant	Emissions Per Year (TONs)
PM 10	0.004039
PM 2.5	0.003627
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000268
N ₂ O	0.000052

Pollutant	Emissions Per Year (TONs)
CO ₂	6.367958
CO ₂ e	6.389299

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.009476
SO _x	0.002127
NO _x	0.001498
CO	0.170646

Pollutant	Emissions Per Year (TONs)
PM 10	0.004039
PM 2.5	0.003627
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000268
N ₂ O	0.000052

Pollutant	Emissions Per Year (TONs)
CO ₂	6.367958
CO ₂ e	6.389299

17.2 Aircraft & Engines

17.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

17.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

17.3 Flight Operations

17.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	166
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

17.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2035, add 16 T-7A Low-Altitude Operations in IR-103 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.061242
SO _x	0.028867
NO _x	0.890296
CO	0.050720

Pollutant	Emissions Per Year (TONs)
PM 10	0.004317
PM 2.5	0.003777
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003634
N ₂ O	0.000709

Pollutant	Emissions Per Year (TONs)
CO ₂	86.424540
CO ₂ e	86.714178

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.061242
SO _x	0.028867
NO _x	0.890296
CO	0.050720

Pollutant	Emissions Per Year (TONs)
PM 10	0.004317
PM 2.5	0.003777
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003634
N ₂ O	0.000709

Pollutant	Emissions Per Year (TONs)
CO ₂	86.424540
CO ₂ e	86.714178

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

18.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 16
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

18.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2035, add 19 T-7A Low-Altitude Operations in VR-158 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.127268
SO _x	0.059990
NO _x	1.850146
CO	0.105402

Pollutant	Emissions Per Year (TONs)
PM 10	0.008970
PM 2.5	0.007849
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007552
N ₂ O	0.001473

Pollutant	Emissions Per Year (TONs)
CO ₂	179.600997
CO ₂ e	180.202900

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.127268
SO _x	0.059990
NO _x	1.850146
CO	0.105402

Pollutant	Emissions Per Year (TONs)
PM 10	0.008970
PM 2.5	0.007849
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007552
N ₂ O	0.001473

Pollutant	Emissions Per Year (TONs)
CO ₂	179.600997
CO ₂ e	180.202900

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

19.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

19.3 Flight Operations

19.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	19
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

19.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

20. Aircraft

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2035, add 245 T-7A Low-Altitude Operations in VR-159 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.594195
SO _x	0.751449
NO _x	23.175518
CO	1.320302

Pollutant	Emissions Per Year (TONs)
PM 10	0.112366
PM 2.5	0.098320
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.094598
N ₂ O	0.018456

Pollutant	Emissions Per Year (TONs)
CO ₂	2249.738805
CO ₂ e	2257.278433

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.594195
SO _x	0.751449
NO _x	23.175518
CO	1.320302

Pollutant	Emissions Per Year (TONs)
PM 10	0.112366
PM 2.5	0.098320
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.094598
N ₂ O	0.018456

Pollutant	Emissions Per Year (TONs)
CO ₂	2249.738805
CO ₂ e	2257.278433

20.2 Aircraft & Engines

20.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

20.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

20.3 Flight Operations

20.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 245
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

20.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

21. Aircraft

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2035: Add T-7A MTR Low-Altitude Operations (VR-1141)

- **Activity Description:**

In 2035, add 23 T-7A Low-Altitude Operations in VR-1141 with 76 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2035

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.158463
SO _x	0.074694
NO _x	2.303641
CO	0.131238

Pollutant	Emissions Per Year (TONs)
PM 10	0.011169
PM 2.5	0.009773
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009403
N ₂ O	0.001835

Pollutant	Emissions Per Year (TONs)
CO ₂	223.623497
CO ₂ e	224.372934

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.158463
SO _x	0.074694
NO _x	2.303641
CO	0.131238

Pollutant	Emissions Per Year (TONs)
PM 10	0.011169
PM 2.5	0.009773
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009403
N ₂ O	0.001835

Pollutant	Emissions Per Year (TONs)
CO ₂	223.623497
CO ₂ e	224.372934

21.2 Aircraft & Engines

21.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

21.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

21.3 Flight Operations

21.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	23
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

21.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

22. Aircraft

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2035, add 30 T-7A Low-Altitude Operations in VR-1142 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.206690
SO _x	0.097427
NO _x	3.004749
CO	0.171180

Pollutant	Emissions Per Year (TONs)
PM 10	0.014568
PM 2.5	0.012747
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.012265
N ₂ O	0.002393

Pollutant	Emissions Per Year (TONs)
CO ₂	291.682822
CO ₂ e	292.660349

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.206690
SO _x	0.097427
NO _x	3.004749
CO	0.171180

Pollutant	Emissions Per Year (TONs)
PM 10	0.014568
PM 2.5	0.012747
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.012265
N ₂ O	0.002393

Pollutant	Emissions Per Year (TONs)
CO ₂	291.682822
CO ₂ e	292.660349

22.2 Aircraft & Engines

22.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

22.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

22.3 Flight Operations

22.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 30
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

22.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

23. Aircraft

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2035, add 151 T-7A Low-Altitude Operations in VR-1143 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.184833
SO _x	0.558490
NO _x	17.224445
CO	0.981271

Pollutant	Emissions Per Year (TONs)
PM 10	0.083512
PM 2.5	0.073073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070307
N ₂ O	0.013717

Pollutant	Emissions Per Year (TONs)
CO ₂	1672.044771
CO ₂ e	1677.648353

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.184833
SO _x	0.558490
NO _x	17.224445
CO	0.981271

Pollutant	Emissions Per Year (TONs)
PM 10	0.083512
PM 2.5	0.073073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070307
N ₂ O	0.013717

Pollutant	Emissions Per Year (TONs)
CO ₂	1672.044771
CO ₂ e	1677.648353

23.2 Aircraft & Engines

23.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

23.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

23.3 Flight Operations

23.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 151
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

23.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
 AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, add 50 T-7A Low-Altitude Operations in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.363622
SO _x	0.171399
NO _x	5.286133
CO	0.301149

Pollutant	Emissions Per Year (TONs)
PM 10	0.025630
PM 2.5	0.022426
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.021577
N ₂ O	0.004210

Pollutant	Emissions Per Year (TONs)
CO ₂	513.145706
CO ₂ e	514.865429

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.363622
SO _x	0.171399
NO _x	5.286133
CO	0.301149

Pollutant	Emissions Per Year (TONs)
PM 10	0.025630
PM 2.5	0.022426
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.021577
N ₂ O	0.004210

Pollutant	Emissions Per Year (TONs)
CO ₂	513.145706
CO ₂ e	514.865429

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	50
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2035, add 486 T-7A Low-Altitude Operations in R-5601 Falcon Range with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.030989
SO _x	0.017238
NO _x	0.220150
CO	0.048873

Pollutant	Emissions Per Year (TONs)
PM 10	0.001859
PM 2.5	0.001576
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002170
N ₂ O	0.000423

Pollutant	Emissions Per Year (TONs)
CO ₂	51.607966
CO ₂ e	51.780922

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.030989
SO _x	0.017238
NO _x	0.220150
CO	0.048873

Pollutant	Emissions Per Year (TONs)
PM 10	0.001859
PM 2.5	0.001576
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002170
N ₂ O	0.000423

Pollutant	Emissions Per Year (TONs)
CO ₂	51.607966
CO ₂ e	51.780922

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 486
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2035, remove 18 T-38C Low-Altitude Operations in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009990
SO _x	-0.014252
NO _x	-0.025574
CO	-0.412787

Pollutant	Emissions Per Year (TONs)
PM 10	-0.015052
PM 2.5	-0.013453
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009990
SO _x	-0.014252
NO _x	-0.025574
CO	-0.412787

Pollutant	Emissions Per Year (TONs)
PM 10	-0.015052
PM 2.5	-0.013453
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	18
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2035, remove 22 T-38C Low-Altitude Operations in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.021368
SO _x	-0.030484
NO _x	-0.054701
CO	-0.882905

Pollutant	Emissions Per Year (TONs)
PM 10	-0.032194
PM 2.5	-0.028775
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003838
N ₂ O	-0.000749

Pollutant	Emissions Per Year (TONs)
CO ₂	-91.266006
CO ₂ e	-91.571869

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.021368
SO _x	-0.030484
NO _x	-0.054701
CO	-0.882905

Pollutant	Emissions Per Year (TONs)
PM 10	-0.032194
PM 2.5	-0.028775
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003838
N ₂ O	-0.000749

Pollutant	Emissions Per Year (TONs)
CO ₂	-91.266006
CO ₂ e	-91.571869

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	22
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2035, remove 280 T-38C Low-Altitude Operations in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.264180
SO _x	-0.376897
NO _x	-0.676301
CO	-10.915918

Pollutant	Emissions Per Year (TONs)
PM 10	-0.398031
PM 2.5	-0.355762
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.047447
N ₂ O	-0.009257

Pollutant	Emissions Per Year (TONs)
CO ₂	-1128.379706
CO ₂ e	-1132.161284

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.264180
SO _x	-0.376897
NO _x	-0.676301
CO	-10.915918

Pollutant	Emissions Per Year (TONs)
PM 10	-0.398031
PM 2.5	-0.355762
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.047447
N ₂ O	-0.009257

Pollutant	Emissions Per Year (TONs)
CO ₂	-1128.379706
CO ₂ e	-1132.161284

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 280
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2035, remove 26 T-38C Low-Altitude Operations in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025974
SO _x	-0.037056
NO _x	-0.066493
CO	-1.073246

Pollutant	Emissions Per Year (TONs)
PM 10	-0.039134
PM 2.5	-0.034978
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004665
N ₂ O	-0.000910

Pollutant	Emissions Per Year (TONs)
CO ₂	-110.941534
CO ₂ e	-111.313336

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025974
SO _x	-0.037056
NO _x	-0.066493
CO	-1.073246

Pollutant	Emissions Per Year (TONs)
PM 10	-0.039134
PM 2.5	-0.034978
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004665
N ₂ O	-0.000910

Pollutant	Emissions Per Year (TONs)
CO ₂	-110.941534
CO ₂ e	-111.313336

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	26
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2035, remove 34 T-38C Low-Altitude Operations in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.033966
SO _x	-0.048458
NO _x	-0.086953
CO	-1.403475

Pollutant	Emissions Per Year (TONs)
PM 10	-0.051175
PM 2.5	-0.045741
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006100
N ₂ O	-0.001190

Pollutant	Emissions Per Year (TONs)
CO ₂	-145.077391
CO ₂ e	-145.563594

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.033966
SO _x	-0.048458
NO _x	-0.086953
CO	-1.403475

Pollutant	Emissions Per Year (TONs)
PM 10	-0.051175
PM 2.5	-0.045741
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006100
N ₂ O	-0.001190

Pollutant	Emissions Per Year (TONs)
CO ₂	-145.077391
CO ₂ e	-145.563594

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	34
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2035, remove 172 T-38C Low-Altitude Operations in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.195693
SO _x	-0.279189
NO _x	-0.500974
CO	-8.086035

Pollutant	Emissions Per Year (TONs)
PM 10	-0.294844
PM 2.5	-0.263533
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035146
N ₂ O	-0.006857

Pollutant	Emissions Per Year (TONs)
CO ₂	-835.854379
CO ₂ e	-838.655606

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.195693
SO _x	-0.279189
NO _x	-0.500974
CO	-8.086035

Pollutant	Emissions Per Year (TONs)
PM 10	-0.294844
PM 2.5	-0.263533
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035146
N ₂ O	-0.006857

Pollutant	Emissions Per Year (TONs)
CO ₂	-835.854379
CO ₂ e	-838.655606

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 172
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, remove 57 T-38C Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.060107
SO _x	-0.085752
NO _x	-0.153873
CO	-2.483601

Pollutant	Emissions Per Year (TONs)
PM 10	-0.090560
PM 2.5	-0.080943
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010795
N ₂ O	-0.002106

Pollutant	Emissions Per Year (TONs)
CO ₂	-256.730088
CO ₂ e	-257.590477

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.060107
SO _x	-0.085752
NO _x	-0.153873
CO	-2.483601

Pollutant	Emissions Per Year (TONs)
PM 10	-0.090560
PM 2.5	-0.080943
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010795
N ₂ O	-0.002106

Pollutant	Emissions Per Year (TONs)
CO ₂	-256.730088
CO ₂ e	-257.590477

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	57
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2035, remove 554 T-38C Low-Altitude Operations in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.031625
SO _x	-0.007099
NO _x	-0.005000
CO	-0.569505

Pollutant	Emissions Per Year (TONs)
PM 10	-0.013478
PM 2.5	-0.012106
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000894
N ₂ O	-0.000174

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.252101
CO ₂ e	-21.323324

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.031625
SO _x	-0.007099
NO _x	-0.005000
CO	-0.569505

Pollutant	Emissions Per Year (TONs)
PM 10	-0.013478
PM 2.5	-0.012106
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000894
N ₂ O	-0.000174

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.252101
CO ₂ e	-21.323324

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 554
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
 AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2036, add 15 T-7A Low-Altitude Operations in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.057414
SO _x	0.027063
NO _x	0.834653
CO	0.047550

Pollutant	Emissions Per Year (TONs)
PM 10	0.004047
PM 2.5	0.003541
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003407
N ₂ O	0.000665

Pollutant	Emissions Per Year (TONs)
CO ₂	81.023006
CO ₂ e	81.294541

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.057414
SO _x	0.027063
NO _x	0.834653
CO	0.047550

Pollutant	Emissions Per Year (TONs)
PM 10	0.004047
PM 2.5	0.003541
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003407
N ₂ O	0.000665

Pollutant	Emissions Per Year (TONs)
CO ₂	81.023006
CO ₂ e	81.294541

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2036, add 18 T-7A Low-Altitude Operations in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.120569
SO _x	0.056832
NO _x	1.752770
CO	0.099855

Pollutant	Emissions Per Year (TONs)
PM 10	0.008498
PM 2.5	0.007436
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007154
N ₂ O	0.001396

Pollutant	Emissions Per Year (TONs)
CO ₂	170.148313
CO ₂ e	170.718537

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.120569
SO _x	0.056832
NO _x	1.752770
CO	0.099855

Pollutant	Emissions Per Year (TONs)
PM 10	0.008498
PM 2.5	0.007436
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007154
N ₂ O	0.001396

Pollutant	Emissions Per Year (TONs)
CO ₂	170.148313
CO ₂ e	170.718537

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 18
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Low-Altitude Operations (VR-159)

- **Activity Description:**

In 2036, add 229 T-7A Low-Altitude Operations in VR-159 with 108 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2036

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	1.490084
SO _x	0.702374
NO _x	21.662015
CO	1.234078

Pollutant	Emissions Per Year (TONs)
PM 10	0.105028
PM 2.5	0.091899
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.088420
N ₂ O	0.017251

Pollutant	Emissions Per Year (TONs)
CO ₂	2102.817088
CO ₂ e	2109.864332

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	1.490084
SO _x	0.702374
NO _x	21.662015
CO	1.234078

Pollutant	Emissions Per Year (TONs)
PM 10	0.105028
PM 2.5	0.091899
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.088420
N ₂ O	0.017251

Pollutant	Emissions Per Year (TONs)
CO ₂	2102.817088
CO ₂ e	2109.864332

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	229
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2036, add 22 T-7A Low-Altitude Operations in VR-1141 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.151573
SO _x	0.071446
NO _x	2.203483
CO	0.125532

Pollutant	Emissions Per Year (TONs)
PM 10	0.010684
PM 2.5	0.009348
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008994
N ₂ O	0.001755

Pollutant	Emissions Per Year (TONs)
CO ₂	213.900736
CO ₂ e	214.617589

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.151573
SO _x	0.071446
NO _x	2.203483
CO	0.125532

Pollutant	Emissions Per Year (TONs)
PM 10	0.010684
PM 2.5	0.009348
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008994
N ₂ O	0.001755

Pollutant	Emissions Per Year (TONs)
CO ₂	213.900736
CO ₂ e	214.617589

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 22
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2036, add 28 T-7A Low-Altitude Operations in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.192911
SO _x	0.090932
NO _x	2.804432
CO	0.159768

Pollutant	Emissions Per Year (TONs)
PM 10	0.013597
PM 2.5	0.011898
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011447
N ₂ O	0.002233

Pollutant	Emissions Per Year (TONs)
CO ₂	272.237301
CO ₂ e	273.149659

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.192911
SO _x	0.090932
NO _x	2.804432
CO	0.159768

Pollutant	Emissions Per Year (TONs)
PM 10	0.013597
PM 2.5	0.011898
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011447
N ₂ O	0.002233

Pollutant	Emissions Per Year (TONs)
CO ₂	272.237301
CO ₂ e	273.149659

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 28
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2036, add 141 T-7A Low-Altitude Operations in VR-1143 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.106367
SO _x	0.521504
NO _x	16.083754
CO	0.916287

Pollutant	Emissions Per Year (TONs)
PM 10	0.077982
PM 2.5	0.068234
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.065651
N ₂ O	0.012809

Pollutant	Emissions Per Year (TONs)
CO ₂	1561.313329
CO ₂ e	1566.545813

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.106367
SO _x	0.521504
NO _x	16.083754
CO	0.916287

Pollutant	Emissions Per Year (TONs)
PM 10	0.077982
PM 2.5	0.068234
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.065651
N ₂ O	0.012809

Pollutant	Emissions Per Year (TONs)
CO ₂	1561.313329
CO ₂ e	1566.545813

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	141
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

40. Aircraft

40.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, add 46 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.334532
SO _x	0.157687
NO _x	4.863242
CO	0.277057

Pollutant	Emissions Per Year (TONs)
PM 10	0.023579
PM 2.5	0.020632
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019851
N ₂ O	0.003873

Pollutant	Emissions Per Year (TONs)
CO ₂	472.094049
CO ₂ e	473.676195

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.334532
SO _x	0.157687
NO _x	4.863242
CO	0.277057

Pollutant	Emissions Per Year (TONs)
PM 10	0.023579
PM 2.5	0.020632
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019851
N ₂ O	0.003873

Pollutant	Emissions Per Year (TONs)
CO ₂	472.094049
CO ₂ e	473.676195

40.2 Aircraft & Engines

40.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

40.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

40.3 Flight Operations

40.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 46
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 38
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

40.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

41. Aircraft

41.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2036, add 454 T-7A Low-Altitude Operations in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.028949
SO _x	0.016103
NO _x	0.205655
CO	0.045655

Pollutant	Emissions Per Year (TONs)
PM 10	0.001736
PM 2.5	0.001472
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002027
N ₂ O	0.000395

Pollutant	Emissions Per Year (TONs)
CO ₂	48.209911
CO ₂ e	48.371478

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.028949
SO _x	0.016103
NO _x	0.205655
CO	0.045655

Pollutant	Emissions Per Year (TONs)
PM 10	0.001736
PM 2.5	0.001472
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002027
N ₂ O	0.000395

Pollutant	Emissions Per Year (TONs)
CO ₂	48.209911
CO ₂ e	48.371478

41.2 Aircraft & Engines

41.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

41.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

41.3 Flight Operations

41.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	454
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

41.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

42. Aircraft

42.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2036, remove 18 T-38C Low-Altitude Operations in IR-103 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009990
SO _x	-0.014252
NO _x	-0.025574
CO	-0.412787

Pollutant	Emissions Per Year (TONs)
PM 10	-0.015052
PM 2.5	-0.013453
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009990
SO _x	-0.014252
NO _x	-0.025574
CO	-0.412787

Pollutant	Emissions Per Year (TONs)
PM 10	-0.015052
PM 2.5	-0.013453
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

42.2 Aircraft & Engines

42.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

42.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

42.3 Flight Operations

42.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 18
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

42.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

43. Aircraft

43.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2036, remove 23 T-38C Low-Altitude Operations in VR-158 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.022339
SO _x	-0.031870
NO _x	-0.057187
CO	-0.923037

Pollutant	Emissions Per Year (TONs)
PM 10	-0.033657
PM 2.5	-0.030083
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004012
N ₂ O	-0.000783

Pollutant	Emissions Per Year (TONs)
CO ₂	-95.414460
CO ₂ e	-95.734226

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.022339
SO _x	-0.031870
NO _x	-0.057187
CO	-0.923037

Pollutant	Emissions Per Year (TONs)
PM 10	-0.033657
PM 2.5	-0.030083
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004012
N ₂ O	-0.000783

Pollutant	Emissions Per Year (TONs)
CO ₂	-95.414460
CO ₂ e	-95.734226

43.2 Aircraft & Engines

43.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

43.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

43.3 Flight Operations

43.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	23
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

43.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

44. Aircraft

44.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2036, remove 287 T-38C Low-Altitude Operations in VR-159 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.270785
SO _x	-0.386319
NO _x	-0.693208
CO	-11.188816

Pollutant	Emissions Per Year (TONs)
PM 10	-0.407982
PM 2.5	-0.364656
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.048633
N ₂ O	-0.009488

Pollutant	Emissions Per Year (TONs)
CO ₂	-1156.589198
CO ₂ e	-1160.465316

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.270785
SO _x	-0.386319
NO _x	-0.693208
CO	-11.188816

Pollutant	Emissions Per Year (TONs)
PM 10	-0.407982
PM 2.5	-0.364656
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.048633
N ₂ O	-0.009488

Pollutant	Emissions Per Year (TONs)
CO ₂	-1156.589198
CO ₂ e	-1160.465316

44.2 Aircraft & Engines

44.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

44.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

44.3 Flight Operations

44.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	287
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

44.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

45. Aircraft

45.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2036, remove 27 T-38C Low-Altitude Operations in VR-1141 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.026973
SO _x	-0.038481
NO _x	-0.069051
CO	-1.114524

Pollutant	Emissions Per Year (TONs)
PM 10	-0.040639
PM 2.5	-0.036324
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.026973
SO _x	-0.038481
NO _x	-0.069051
CO	-1.114524

Pollutant	Emissions Per Year (TONs)
PM 10	-0.040639
PM 2.5	-0.036324
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

45.2 Aircraft & Engines

45.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

45.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

45.3 Flight Operations

45.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 27
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

45.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

46. Aircraft

46.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2036, remove 35 T-38C Low-Altitude Operations in VR-1142 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.034965
SO _x	-0.049883
NO _x	-0.089510
CO	-1.444754

Pollutant	Emissions Per Year (TONs)
PM 10	-0.052681
PM 2.5	-0.047086
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006280
N ₂ O	-0.001225

Pollutant	Emissions Per Year (TONs)
CO ₂	-149.344373
CO ₂ e	-149.844876

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.034965
SO _x	-0.049883
NO _x	-0.089510
CO	-1.444754

Pollutant	Emissions Per Year (TONs)
PM 10	-0.052681
PM 2.5	-0.047086
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006280
N ₂ O	-0.001225

Pollutant	Emissions Per Year (TONs)
CO ₂	-149.344373
CO ₂ e	-149.844876

46.2 Aircraft & Engines

46.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

46.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

46.3 Flight Operations

46.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	35
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

46.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

47. Aircraft

47.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2036, remove 176 T-38C Low-Altitude Operations in VR-1143 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.200244
SO _x	-0.285681
NO _x	-0.512625
CO	-8.274082

Pollutant	Emissions Per Year (TONs)
PM 10	-0.301701
PM 2.5	-0.269662
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035964
N ₂ O	-0.007017

Pollutant	Emissions Per Year (TONs)
CO ₂	-855.292852
CO ₂ e	-858.159225

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.200244
SO _x	-0.285681
NO _x	-0.512625
CO	-8.274082

Pollutant	Emissions Per Year (TONs)
PM 10	-0.301701
PM 2.5	-0.269662
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035964
N ₂ O	-0.007017

Pollutant	Emissions Per Year (TONs)
CO ₂	-855.292852
CO ₂ e	-858.159225

47.2 Aircraft & Engines

47.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

47.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

47.3 Flight Operations

47.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	176
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

47.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

48. Aircraft

48.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, remove 58 T-38C Low-Altitude Operations in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.061161
SO _x	-0.087256
NO _x	-0.156572
CO	-2.527173

Pollutant	Emissions Per Year (TONs)
PM 10	-0.092149
PM 2.5	-0.082363
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010985
N ₂ O	-0.002143

Pollutant	Emissions Per Year (TONs)
CO ₂	-261.234125
CO ₂ e	-262.109608

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.061161
SO _x	-0.087256
NO _x	-0.156572
CO	-2.527173

Pollutant	Emissions Per Year (TONs)
PM 10	-0.092149
PM 2.5	-0.082363
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010985
N ₂ O	-0.002143

Pollutant	Emissions Per Year (TONs)
CO ₂	-261.234125
CO ₂ e	-262.109608

48.2 Aircraft & Engines

48.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

48.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

48.3 Flight Operations

48.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 58
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

48.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

49. Aircraft

49.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2036, remove 568 T-38C Low-Altitude Operations in R-5601 Falcon Range with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.032424
SO _x	-0.007278
NO _x	-0.005127
CO	-0.583897

Pollutant	Emissions Per Year (TONs)
PM 10	-0.013819
PM 2.5	-0.012412
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000916
N ₂ O	-0.000179

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.789158
CO ₂ e	-21.862181

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.032424
SO _x	-0.007278
NO _x	-0.005127
CO	-0.583897

Pollutant	Emissions Per Year (TONs)
PM 10	-0.013819
PM 2.5	-0.012412
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000916
N ₂ O	-0.000179

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.789158
CO ₂ e	-21.862181

49.2 Aircraft & Engines

49.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

49.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

49.3 Flight Operations

49.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	568
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

49.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

50. Aircraft

50.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2037, add 2 T-7A Low-Altitude Operations in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.007655
SO _x	0.003608
NO _x	0.111287
CO	0.006340

Pollutant	Emissions Per Year (TONs)
PM 10	0.000540
PM 2.5	0.000472
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.007655
SO _x	0.003608
NO _x	0.111287
CO	0.006340

Pollutant	Emissions Per Year (TONs)
PM 10	0.000540
PM 2.5	0.000472
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

50.2 Aircraft & Engines

50.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

50.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

50.3 Flight Operations

50.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 2
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

50.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL} : Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

51. Aircraft

51.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2037, add 3 T-7A Low-Altitude Operations in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.020095
SO _x	0.009472
NO _x	0.292128
CO	0.016642

Pollutant	Emissions Per Year (TONs)
PM 10	0.001416
PM 2.5	0.001239
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001192
N ₂ O	0.000233

Pollutant	Emissions Per Year (TONs)
CO ₂	28.358052
CO ₂ e	28.453089

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.020095
SO _x	0.009472
NO _x	0.292128
CO	0.016642

Pollutant	Emissions Per Year (TONs)
PM 10	0.001416
PM 2.5	0.001239
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001192
N ₂ O	0.000233

Pollutant	Emissions Per Year (TONs)
CO ₂	28.358052
CO ₂ e	28.453089

51.2 Aircraft & Engines

51.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

51.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

51.3 Flight Operations

51.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	3
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

51.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

52. Aircraft

52.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2037, add 37 T-7A Low-Altitude Operations in VR-159 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.240756
SO _x	0.113484
NO _x	3.499976
CO	0.199393

Pollutant	Emissions Per Year (TONs)
PM 10	0.016970
PM 2.5	0.014848
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014286
N ₂ O	0.002787

Pollutant	Emissions Per Year (TONs)
CO ₂	339.756473
CO ₂ e	340.895110

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.240756
SO _x	0.113484
NO _x	3.499976
CO	0.199393

Pollutant	Emissions Per Year (TONs)
PM 10	0.016970
PM 2.5	0.014848
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014286
N ₂ O	0.002787

Pollutant	Emissions Per Year (TONs)
CO ₂	339.756473
CO ₂ e	340.895110

52.2 Aircraft & Engines

52.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

52.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

52.3 Flight Operations

52.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 37
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

52.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

53. Aircraft

53.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2037, add 4 T-7A Low-Altitude Operations in VR-1141 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.027559
SO _x	0.012990
NO _x	0.400633
CO	0.022824

Pollutant	Emissions Per Year (TONs)
PM 10	0.001942
PM 2.5	0.001700
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.027559
SO _x	0.012990
NO _x	0.400633
CO	0.022824

Pollutant	Emissions Per Year (TONs)
PM 10	0.001942
PM 2.5	0.001700
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

53.2 Aircraft & Engines

53.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

53.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

53.3 Flight Operations

53.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 4
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

53.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

54. Aircraft

54.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2037, add 5 T-7A Low-Altitude Operations in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.034448
SO _x	0.016238
NO _x	0.500792
CO	0.028530

Pollutant	Emissions Per Year (TONs)
PM 10	0.002428
PM 2.5	0.002125
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.034448
SO _x	0.016238
NO _x	0.500792
CO	0.028530

Pollutant	Emissions Per Year (TONs)
PM 10	0.002428
PM 2.5	0.002125
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

54.2 Aircraft & Engines

54.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

54.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

54.3 Flight Operations

54.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

54.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

55. Aircraft

55.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2037, add 23 T-7A Low-Altitude Operations in VR-1143 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.180471
SO _x	0.085068
NO _x	2.623591
CO	0.149465

Pollutant	Emissions Per Year (TONs)
PM 10	0.012720
PM 2.5	0.011130
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010709
N ₂ O	0.002089

Pollutant	Emissions Per Year (TONs)
CO ₂	254.682316
CO ₂ e	255.535842

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.180471
SO _x	0.085068
NO _x	2.623591
CO	0.149465

Pollutant	Emissions Per Year (TONs)
PM 10	0.012720
PM 2.5	0.011130
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010709
N ₂ O	0.002089

Pollutant	Emissions Per Year (TONs)
CO ₂	254.682316
CO ₂ e	255.535842

55.2 Aircraft & Engines

55.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

55.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

55.3 Flight Operations

55.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 23
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 41
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

55.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

56. Aircraft

56.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, add 8 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.058179
SO _x	0.027424
NO _x	0.845781
CO	0.048184

Pollutant	Emissions Per Year (TONs)
PM 10	0.004101
PM 2.5	0.003588
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003452
N ₂ O	0.000674

Pollutant	Emissions Per Year (TONs)
CO ₂	82.103313
CO ₂ e	82.378469

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.058179
SO _x	0.027424
NO _x	0.845781
CO	0.048184

Pollutant	Emissions Per Year (TONs)
PM 10	0.004101
PM 2.5	0.003588
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003452
N ₂ O	0.000674

Pollutant	Emissions Per Year (TONs)
CO ₂	82.103313
CO ₂ e	82.378469

56.2 Aircraft & Engines

56.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

56.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

56.3 Flight Operations

56.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	8
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

56.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

57. Aircraft

57.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2037, add 74 T-7A Low-Altitude Operations in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.004719
SO _x	0.002625
NO _x	0.033521
CO	0.007442

Pollutant	Emissions Per Year (TONs)
PM 10	0.000283
PM 2.5	0.000240
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000330
N ₂ O	0.000064

Pollutant	Emissions Per Year (TONs)
CO ₂	7.858003
CO ₂ e	7.884338

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.004719
SO _x	0.002625
NO _x	0.033521
CO	0.007442

Pollutant	Emissions Per Year (TONs)
PM 10	0.000283
PM 2.5	0.000240
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000330
N ₂ O	0.000064

Pollutant	Emissions Per Year (TONs)
CO ₂	7.858003
CO ₂ e	7.884338

57.2 Aircraft & Engines

57.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

57.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

57.3 Flight Operations

57.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 74
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

57.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

58. Aircraft

58.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX;
Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2037, remove 6 T-38C Low-Altitude Operations in VR-158 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005828
SO _x	-0.008314
NO _x	-0.014918
CO	-0.240792

Pollutant	Emissions Per Year (TONs)
PM 10	-0.008780
PM 2.5	-0.007848
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001047
N ₂ O	-0.000204

Pollutant	Emissions Per Year (TONs)
CO ₂	-24.890729
CO ₂ e	-24.974146

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005828
SO _x	-0.008314
NO _x	-0.014918
CO	-0.240792

Pollutant	Emissions Per Year (TONs)
PM 10	-0.008780
PM 2.5	-0.007848
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001047
N ₂ O	-0.000204

Pollutant	Emissions Per Year (TONs)
CO ₂	-24.890729
CO ₂ e	-24.974146

58.2 Aircraft & Engines

58.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

58.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

58.3 Flight Operations

58.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	6
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

58.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

59. Aircraft

59.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2037, remove 76 T-38C Low-Altitude Operations in VR-159 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.071706
SO _x	-0.102301
NO _x	-0.183567
CO	-2.962892

Pollutant	Emissions Per Year (TONs)
PM 10	-0.108037
PM 2.5	-0.096564
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.012878
N ₂ O	-0.002513

Pollutant	Emissions Per Year (TONs)
CO ₂	-306.274492
CO ₂ e	-307.300920

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.071706
SO _x	-0.102301
NO _x	-0.183567
CO	-2.962892

Pollutant	Emissions Per Year (TONs)
PM 10	-0.108037
PM 2.5	-0.096564
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.012878
N ₂ O	-0.002513

Pollutant	Emissions Per Year (TONs)
CO ₂	-306.274492
CO ₂ e	-307.300920

59.2 Aircraft & Engines

59.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

59.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

59.3 Flight Operations

59.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 76
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

59.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

60. Aircraft

60.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2037, remove 7 T-38C Low-Altitude Operations in VR-1141 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006993
SO _x	-0.009977
NO _x	-0.017902
CO	-0.288951

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010536
PM 2.5	-0.009417
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006993
SO _x	-0.009977
NO _x	-0.017902
CO	-0.288951

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010536
PM 2.5	-0.009417
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

60.2 Aircraft & Engines

60.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

60.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

60.3 Flight Operations

60.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47

Flight Operation Cycle Type: LFP (Low Flight Pattern)

Number of Annual Flight Operation Cycles for all Aircraft: 7

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0

Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins): 36

Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0

Approach (mins): 0

Intermediate (mins): 0

Military (mins): 0

Afterburn (mins): 0

60.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

61. Aircraft

61.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2037, remove 9 T-38C Low-Altitude Operations in VR-1142 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008991
SO _x	-0.012827
NO _x	-0.023017
CO	-0.371508

Pollutant	Emissions Per Year (TONs)
PM 10	-0.013546
PM 2.5	-0.012108
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001615
N ₂ O	-0.000315

Pollutant	Emissions Per Year (TONs)
CO ₂	-38.402839
CO ₂ e	-38.531539

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008991
SO _x	-0.012827
NO _x	-0.023017
CO	-0.371508

Pollutant	Emissions Per Year (TONs)
PM 10	-0.013546
PM 2.5	-0.012108
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001615
N ₂ O	-0.000315

Pollutant	Emissions Per Year (TONs)
CO ₂	-38.402839
CO ₂ e	-38.531539

61.2 Aircraft & Engines

61.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

61.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

61.3 Flight Operations

61.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	9
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

61.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

62. Aircraft

62.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2037, remove 47 T-38C Low-Altitude Operations in VR-1143 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.053474
SO _x	-0.076290
NO _x	-0.136894
CO	-2.209556

Pollutant	Emissions Per Year (TONs)
PM 10	-0.080568
PM 2.5	-0.072012
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009604
N ₂ O	-0.001874

Pollutant	Emissions Per Year (TONs)
CO ₂	-228.402069
CO ₂ e	-229.167520

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.053474
SO _x	-0.076290
NO _x	-0.136894
CO	-2.209556

Pollutant	Emissions Per Year (TONs)
PM 10	-0.080568
PM 2.5	-0.072012
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009604
N ₂ O	-0.001874

Pollutant	Emissions Per Year (TONs)
CO ₂	-228.402069
CO ₂ e	-229.167520

62.2 Aircraft & Engines

62.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

62.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

62.3 Flight Operations

62.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 47
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

62.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

63. Aircraft

63.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, remove 15 T-38C Low-Altitude Operations in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.015818
SO _x	-0.022566
NO _x	-0.040493
CO	-0.653579

Pollutant	Emissions Per Year (TONs)
PM 10	-0.023832
PM 2.5	-0.021301
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002841
N ₂ O	-0.000554

Pollutant	Emissions Per Year (TONs)
CO ₂	-67.560550
CO ₂ e	-67.786968

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.015818
SO _x	-0.022566
NO _x	-0.040493
CO	-0.653579

Pollutant	Emissions Per Year (TONs)
PM 10	-0.023832
PM 2.5	-0.021301
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002841
N ₂ O	-0.000554

Pollutant	Emissions Per Year (TONs)
CO ₂	-67.560550
CO ₂ e	-67.786968

63.2 Aircraft & Engines

63.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

63.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

63.3 Flight Operations

63.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

63.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

64. Aircraft

64.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? [Remove](#)

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2037, remove 150 T-38C Low-Altitude Operations in R-5601 Falcon Range with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008563
SO _x	-0.001922
NO _x	-0.001354
CO	-0.154198

Pollutant	Emissions Per Year (TONs)
PM 10	-0.003649
PM 2.5	-0.003278
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000242
N ₂ O	-0.000047

Pollutant	Emissions Per Year (TONs)
CO ₂	-5.754179
CO ₂ e	-5.773463

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008563
SO _x	-0.001922
NO _x	-0.001354
CO	-0.154198

Pollutant	Emissions Per Year (TONs)
PM 10	-0.003649
PM 2.5	-0.003278
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000242
N ₂ O	-0.000047

Pollutant	Emissions Per Year (TONs)
CO ₂	-5.754179
CO ₂ e	-5.773463

64.2 Aircraft & Engines

64.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

64.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

64.3 Flight Operations

64.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 150
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

64.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

65. Aircraft

65.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2037, remove 5 T-38C Low-Altitude Operations in IR-103 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.002775
SO _x	-0.003959
NO _x	-0.007104
CO	-0.114663

Pollutant	Emissions Per Year (TONs)
PM 10	-0.004181
PM 2.5	-0.003737
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000498
N ₂ O	-0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.852728
CO ₂ e	-11.892450

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.002775
SO _x	-0.003959
NO _x	-0.007104
CO	-0.114663

Pollutant	Emissions Per Year (TONs)
PM 10	-0.004181
PM 2.5	-0.003737
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000498
N ₂ O	-0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.852728
CO ₂ e	-11.892450

65.2 Aircraft & Engines

65.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

65.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

65.3 Flight Operations

65.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47

Flight Operation Cycle Type: LFP (Low Flight Pattern)

Number of Annual Flight Operation Cycles for all Aircraft: 5

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0

Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins): 20

Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0

Approach (mins): 0

Intermediate (mins): 0

Military (mins): 0

Afterburn (mins): 0

65.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

SUA ROI: Alternative 2 GHG Report (Destination Cycles)

AIR CONFORMITY APPLICABILITY MODEL REPORT GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to estimate GHG emissions associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the GHG emissions analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Greer, OK; Harmon, OK; Jackson, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Washita, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2, SUA Destination Cycle

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action's start through the action's "steady state" (SS, net gain/loss in emission stabilized and the action is fully implemented) of emissions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO₂ equivalents (CO₂e). The CO₂e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO₂. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 tons per year (ton/yr) of CO₂e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO₂e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO₂e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected steady state of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e	Threshold	Exceedance
2034	15,086	0.63432752	0.12375744	15,136	68,039	No
2035	32,562	1.36919628	0.2671305	32,671	68,039	No
2036	49,321	2.07388416	0.40461526	49,486	68,039	No
2037	49,956	2.10058093	0.40982381	50,124	68,039	No
2038 [SS Year]	49,956	2.10058093	0.40982381	50,124	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. <https://statesummaries.ncics.org/downloads/>).

State's Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2034	700,652,689	3,554,625	135,896	836,194,567
2035	700,652,689	3,554,625	135,896	836,194,567
2036	700,652,689	3,554,625	135,896	836,194,567
2037	700,652,689	3,554,625	135,896	836,194,567
2038 [SS Year]	700,652,689	3,554,625	135,896	836,194,567

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO2	CH4	N2O	CO2e
2034	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2035	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2036	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2037	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2038 [SS Year]	5,136,454,179	25,626,912	1,500,708	6,251,695,230

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact on local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where the action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO2	CH4	N2O	CO2e
2034-2038	State Total	3,503,263,447	17,773,124	679,479	4,180,972,834
2034-2038	U.S. Total	25,682,270,895	128,134,558	7,503,538	31,258,476,148
2034-2038	Action	196,881	8.27857	1.615151	197,541
Percent of State Totals		0.00561994%	0.00004658%	0.00023770%	0.00472476%
Percent of U.S. Totals		0.00076660%	0.00000646%	0.00002153%	0.00063196%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00008468%.*

* Global value based on the U.S. emitting 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, <https://www.c2es.org/content/international-emissions>).

SUA ROI: Alternative 2 ACAM Detail Report (Destination Cycles)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Greer, OK; Harmon, OK; Jackson, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Washita, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2, SUA Destination Cycle

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-

site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Destination Cycles (IR-103)
3.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-158)
4.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-159)
5.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1141)
6.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1142)
7.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1143)
8.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1146)
9.	Aircraft	2034: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
10.	Aircraft	2034: Add T-7A MOA Destination Cycles (Hollis MOA)
11.	Aircraft	2034: Add T-7A MOA Destination Cycles (Westover 1 MOA)
12.	Aircraft	2034: Add T-7A MOA Destination Cycles (Westover 2 MOA)
13.	Aircraft	2034: Add T-7A MOA Destination Cycles (Washita MOA)
14.	Aircraft	2034: Remove T-38C MTR Destination Cycles (IR-103)
15.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-158)
16.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-159)
17.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1141)
18.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1142)
19.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1143)
20.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1146)
21.	Aircraft	2034: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
22.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Hollis MOA)
23.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
24.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
25.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Washita MOA)
26.	Aircraft	2035: Add T-7A MTR Destination Cycles (IR-103)
27.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-158)
28.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-159)
29.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1141)
30.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1142)
31.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1143)
32.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1146)
33.	Aircraft	2035: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
34.	Aircraft	2035: Add T-7A MOA Destination Cycles (Hollis MOA)
35.	Aircraft	2035: Add T-7A MOA Destination Cycles (Westover 1 MOA)
36.	Aircraft	2035: Add T-7A MOA Destination Cycles (Westover 2 MOA)
37.	Aircraft	2035: Add T-7A MOA Destination Cycles (Washita MOA)
38.	Aircraft	2035: Remove T-38C MTR Destination Cycles (IR-103)
39.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-158)
40.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-159)

EIS for T-7A Recapitalization at Sheppard AFB, Texas
AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Activity Type		Activity Title
41.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1141)
42.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1142)
43.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1143)
44.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1146)
45.	Aircraft	2035: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
46.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Hollis MOA)
47.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
48.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
49.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Washita MOA)
50.	Aircraft	2036: Add T-7A MTR Destination Cycles (IR-103)
51.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-158)
52.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-159)
53.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1141)
54.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1142)
55.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1143)
56.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1146)
57.	Aircraft	2036: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
58.	Aircraft	2036: Add T-7A MOA Destination Cycles (Hollis MOA)
59.	Aircraft	2036: Add T-7A MOA Destination Cycles (Westover 1 MOA)
60.	Aircraft	2036: Add T-7A MOA Destination Cycles (Westover 2 MOA)
61.	Aircraft	2036: Add T-7A MOA Destination Cycles (Washita MOA)
62.	Aircraft	2036: Remove T-38C MTR Destination Cycles (IR-103)
63.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-158)
64.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-159)
65.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1141)
66.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1142)
67.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1143)
68.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1146)
69.	Aircraft	2036: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
70.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Hollis MOA)
71.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
72.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
73.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Washita MOA)
74.	Aircraft	2037: Add T-7A MTR Destination Cycles (IR-103)
75.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-158)
76.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-159)
77.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1141)
78.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1142)
79.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1143)
80.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1146)
81.	Aircraft	2037: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
82.	Aircraft	2037: Add T-7A MOA Destination Cycles (Hollis MOA)
83.	Aircraft	2037: Add T-7A MOA Destination Cycles (Westover 1 MOA)
84.	Aircraft	2037: Add T-7A MOA Destination Cycles (Westover 2 MOA)
85.	Aircraft	2037: Add T-7A MOA Destination Cycles (Washita MOA)
86.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-158)
87.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-159)
88.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1141)
89.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1142)
90.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1143)
91.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1146)
92.	Aircraft	2037: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
93.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Hollis MOA)
94.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
95.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

Activity Type		Activity Title
96.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Washita MOA)
97.	Aircraft	2037: Remove T-38C MTR Destination Cycles (IR-103)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2034, add 4 T-7A Destination Cycles in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000909
N ₂ O	0.000177

Pollutant	Emissions Per Year (TONs)
CO ₂	21.606135
CO ₂ e	21.678544

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000909
N ₂ O	0.000177

Pollutant	Emissions Per Year (TONs)
CO ₂	21.606135
CO ₂ e	21.678544

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2034, add 5 T-7A Destination Cycles in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001987
N ₂ O	0.000388

Pollutant	Emissions Per Year (TONs)
CO ₂	47.263420
CO ₂ e	47.421816

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001987
N ₂ O	0.000388

Pollutant	Emissions Per Year (TONs)
CO ₂	47.263420
CO ₂ e	47.421816

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 5
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2034, add 64 T-7A Destination Cycles in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.024711
N ₂ O	0.004821

Pollutant	Emissions Per Year (TONs)
CO ₂	587.686872
CO ₂ e	589.656407

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.024711
N ₂ O	0.004821

Pollutant	Emissions Per Year (TONs)
CO ₂	587.686872
CO ₂ e	589.656407

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	64
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2034, add 6 T-7A Destination Cycles in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 6
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MTR Destination Cycles (VR-1142)

- **Activity Description:**

In 2034, add 8 T-7A Destination Cycles in VR-1142 with 28 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2034

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003271
N ₂ O	0.000638

Pollutant	Emissions Per Year (TONs)
CO ₂	77.782086
CO ₂ e	78.042760

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003271
N ₂ O	0.000638

Pollutant	Emissions Per Year (TONs)
CO ₂	77.782086
CO ₂ e	78.042760

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	8
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2034, add 39 T-7A Destination Cycles in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018159
N ₂ O	0.003543

Pollutant	Emissions Per Year (TONs)
CO ₂	431.852623
CO ₂ e	433.299906

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018159
N ₂ O	0.003543

Pollutant	Emissions Per Year (TONs)
CO ₂	431.852623
CO ₂ e	433.299906

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 39
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2034, add 14 T-7A Destination Cycles in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006042
N ₂ O	0.001179

Pollutant	Emissions Per Year (TONs)
CO ₂	143.680798
CO ₂ e	144.162320

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006042
N ₂ O	0.001179

Pollutant	Emissions Per Year (TONs)
CO ₂	143.680798
CO ₂ e	144.162320

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 14
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2034, add 315 T-7A Destination Cycles in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001407
N ₂ O	0.000274

Pollutant	Emissions Per Year (TONs)
CO ₂	33.449608
CO ₂ e	33.561709

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001407
N ₂ O	0.000274

Pollutant	Emissions Per Year (TONs)
CO ₂	33.449608
CO ₂ e	33.561709

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	315
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2034, add 21 T-7A Destination Cycles in Hollis MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003288
N ₂ O	0.000641

Pollutant	Emissions Per Year (TONs)
CO ₂	78.193888
CO ₂ e	78.455942

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003288
N ₂ O	0.000641

Pollutant	Emissions Per Year (TONs)
CO ₂	78.193888
CO ₂ e	78.455942

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

10.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 21
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2034, add 1,161 T-7A Destination Cycles in Westover 1 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.218131
N ₂ O	0.042557

Pollutant	Emissions Per Year (TONs)
CO ₂	5187.605952
CO ₂ e	5204.991356

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.218131
N ₂ O	0.042557

Pollutant	Emissions Per Year (TONs)
CO ₂	5187.605952
CO ₂ e	5204.991356

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

11.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,161
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

11.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2034, add 296 T-7A Destination Cycles in Westover 2 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.057481
N ₂ O	0.011215

Pollutant	Emissions Per Year (TONs)
CO ₂	1367.013049
CO ₂ e	1371.594367

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.057481
N ₂ O	0.011215

Pollutant	Emissions Per Year (TONs)
CO ₂	1367.013049
CO ₂ e	1371.594367

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

12.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 296
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

12.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2034, add 584 T-7A Destination Cycles in Washita MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.107517
N ₂ O	0.020977

Pollutant	Emissions Per Year (TONs)
CO ₂	2556.967121
CO ₂ e	2565.536374

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.107517
N ₂ O	0.020977

Pollutant	Emissions Per Year (TONs)
CO ₂	2556.967121
CO ₂ e	2565.536374

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

13.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 584
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 7.5
 Climb Out [Intermediate] (mins): 10
 Takeoff [Military] (mins): 7.5
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

13.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2034, add 5 T-38C Destination Cycles in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000498
N ₂ O	0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	11.852728
CO ₂ e	11.892450

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000498
N ₂ O	0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	11.852728
CO ₂ e	11.892450

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

14.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

14.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2034, add 7 T-38C Destination Cycles in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001221
N ₂ O	0.000238

Pollutant	Emissions Per Year (TONs)
CO ₂	29.039184
CO ₂ e	29.136504

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001221
N ₂ O	0.000238

Pollutant	Emissions Per Year (TONs)
CO ₂	29.039184
CO ₂ e	29.136504

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

15.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	7
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

15.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

16. Aircraft

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2034, add 84 T-38C Destination Cycles in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014234
N ₂ O	0.002777

Pollutant	Emissions Per Year (TONs)
CO ₂	338.513912
CO ₂ e	339.648385

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014234
N ₂ O	0.002777

Pollutant	Emissions Per Year (TONs)
CO ₂	338.513912
CO ₂ e	339.648385

16.2 Aircraft & Engines

16.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

16.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

16.3 Flight Operations

16.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 84
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

16.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

17. Aircraft

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2034, add 8 T-38C Destination Cycles in VR-1141 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001435
N ₂ O	0.000280

Pollutant	Emissions Per Year (TONs)
CO ₂	34.135857
CO ₂ e	34.250257

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001435
N ₂ O	0.000280

Pollutant	Emissions Per Year (TONs)
CO ₂	34.135857
CO ₂ e	34.250257

17.2 Aircraft & Engines

17.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

17.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

17.3 Flight Operations

17.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	8
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

17.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2034, add 10 T-38C Destination Cycles in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001794
N ₂ O	0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	42.669821
CO ₂ e	42.812822

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001794
N ₂ O	0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	42.669821
CO ₂ e	42.812822

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

18.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	10
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

18.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2034, add 51 T-38C Destination Cycles in VR-1143 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010421
N ₂ O	0.002033

Pollutant	Emissions Per Year (TONs)
CO ₂	247.840542
CO ₂ e	248.671139

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010421
N ₂ O	0.002033

Pollutant	Emissions Per Year (TONs)
CO ₂	247.840542
CO ₂ e	248.671139

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

19.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

19.3 Flight Operations

19.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 51
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

19.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

20. Aircraft

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2034, add 18 T-38C Destination Cycles in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003409
N ₂ O	0.000665

Pollutant	Emissions Per Year (TONs)
CO ₂	81.072660
CO ₂ e	81.344361

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003409
N ₂ O	0.000665

Pollutant	Emissions Per Year (TONs)
CO ₂	81.072660
CO ₂ e	81.344361

20.2 Aircraft & Engines

20.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

20.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

20.3 Flight Operations

20.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	18
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

20.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

21. Aircraft

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2034, add 412 T-38C Destination Cycles in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000665
N ₂ O	0.000130

Pollutant	Emissions Per Year (TONs)
CO ₂	15.804812
CO ₂ e	15.857779

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000665
N ₂ O	0.000130

Pollutant	Emissions Per Year (TONs)
CO ₂	15.804812
CO ₂ e	15.857779

21.2 Aircraft & Engines

21.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

21.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

21.3 Flight Operations

21.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 412
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

21.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

22. Aircraft

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2034, add 28 T-38C Destination Cycles in Hollis MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001973
N ₂ O	0.000385

Pollutant	Emissions Per Year (TONs)
CO ₂	46.926872
CO ₂ e	47.084140

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001973
N ₂ O	0.000385

Pollutant	Emissions Per Year (TONs)
CO ₂	46.926872
CO ₂ e	47.084140

22.2 Aircraft & Engines

22.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

22.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

22.3 Flight Operations

22.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131

Flight Operation Cycle Type: DC (Destination Cycle)

Number of Annual Flight Operation Cycles for all Aircraft: 28

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

22.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

23. Aircraft

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2034, add 1,519 T-38C Destination Cycles in Westover 1 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.128456
N ₂ O	0.025062

Pollutant	Emissions Per Year (TONs)
CO ₂	3054.939381
CO ₂ e	3065.177506

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.128456
N ₂ O	0.025062

Pollutant	Emissions Per Year (TONs)
CO ₂	3054.939381
CO ₂ e	3065.177506

23.2 Aircraft & Engines

23.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

23.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

23.3 Flight Operations

23.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,519
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

23.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2034, add 388 T-38C Destination Cycles in Westover 2 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.034677
N ₂ O	0.006766

Pollutant	Emissions Per Year (TONs)
CO ₂	824.699616
CO ₂ e	827.463461

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.034677
N ₂ O	0.006766

Pollutant	Emissions Per Year (TONs)
CO ₂	824.699616
CO ₂ e	827.463461

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 388
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

, AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2034, add 764 T-38C Destination Cycles in Washita MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055087
N ₂ O	0.010748

Pollutant	Emissions Per Year (TONs)
CO ₂	1310.087899
CO ₂ e	1314.478442

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055087
N ₂ O	0.010748

Pollutant	Emissions Per Year (TONs)
CO ₂	1310.087899
CO ₂ e	1314.478442

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	764
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2035, add 16 T-7A Destination Cycles in IR-103 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003634
N ₂ O	0.000709

Pollutant	Emissions Per Year (TONs)
CO ₂	86.424540
CO ₂ e	86.714178

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003634
N ₂ O	0.000709

Pollutant	Emissions Per Year (TONs)
CO ₂	86.424540
CO ₂ e	86.714178

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 16
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2035, add 21 T-7A Destination Cycles in VR-158 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008347
N ₂ O	0.001628

Pollutant	Emissions Per Year (TONs)
CO ₂	198.506365
CO ₂ e	199.171626

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008347
N ₂ O	0.001628

Pollutant	Emissions Per Year (TONs)
CO ₂	198.506365
CO ₂ e	199.171626

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	21
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2035, add 245 T-7A Destination Cycles in VR-159 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.094598
N ₂ O	0.018456

Pollutant	Emissions Per Year (TONs)
CO ₂	2249.738805
CO ₂ e	2257.278433

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.094598
N ₂ O	0.018456

Pollutant	Emissions Per Year (TONs)
CO ₂	2249.738805
CO ₂ e	2257.278433

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 245
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2035: Add T-7A MTR Destination Cycles (VR-1141)

- **Activity Description:**

In 2035, add 24 T-7A Destination Cycles in VR-1141 with 76 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2035

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	24
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used),

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2035, add 30 T-7A Destination Cycles in VR-1142 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.012265
N ₂ O	0.002393

Pollutant	Emissions Per Year (TONs)
CO ₂	291.682822
CO ₂ e	292.660349

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.012265
N ₂ O	0.002393

Pollutant	Emissions Per Year (TONs)
CO ₂	291.682822
CO ₂ e	292.660349

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 30
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2035, add 151 T-7A Destination Cycles in VR-1143 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070307
N ₂ O	0.013717

Pollutant	Emissions Per Year (TONs)
CO ₂	1672.044771
CO ₂ e	1677.648353

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.070307
N ₂ O	0.013717

Pollutant	Emissions Per Year (TONs)
CO ₂	1672.044771
CO ₂ e	1677.648353

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 151
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2035, add 54 T-7A Destination Cycles in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.023303
N ₂ O	0.004546

Pollutant	Emissions Per Year (TONs)
CO ₂	554.197362
CO ₂ e	556.054663

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.023303
N ₂ O	0.004546

Pollutant	Emissions Per Year (TONs)
CO ₂	554.197362
CO ₂ e	556.054663

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	54
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)
AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)
AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)
AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)
AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2035, add 1,207 T-7A Destination Cycles in R-5601 Falcon Range with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005389
N ₂ O	0.001051

Pollutant	Emissions Per Year (TONs)
CO ₂	128.170402
CO ₂ e	128.599944

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005389
N ₂ O	0.001051

Pollutant	Emissions Per Year (TONs)
CO ₂	128.170402
CO ₂ e	128.599944

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 1,207
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2035, add 81 T-7A Destination Cycles in Hollis MOA with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.012682
N ₂ O	0.002474

Pollutant	Emissions Per Year (TONs)
CO ₂	301.604997
CO ₂ e	302.615777

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.012682
N ₂ O	0.002474

Pollutant	Emissions Per Year (TONs)
CO ₂	301.604997
CO ₂ e	302.615777

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	81
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2035, add 4,449 T-7A Destination Cycles in Westover 1 MOA with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.835888
N ₂ O	0.163082

Pollutant	Emissions Per Year (TONs)
CO ₂	19879.120482
CO ₂ e	19945.742071

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.835888
N ₂ O	0.163082

Pollutant	Emissions Per Year (TONs)
CO ₂	19879.120482
CO ₂ e	19945.742071

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 4,449
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 23.4
 Climb Out [Intermediate] (mins): 5.4
 Takeoff [Military] (mins): 7.2
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2035, add 1,136 T-7A Destination Cycles in Westover 2 MOA with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.220602
N ₂ O	0.043040

Pollutant	Emissions Per Year (TONs)
CO ₂	5246.374404
CO ₂ e	5263.956761

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.220602
N ₂ O	0.043040

Pollutant	Emissions Per Year (TONs)
CO ₂	5246.374404
CO ₂ e	5263.956761

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,136
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2035, add 2,238 T-7A Destination Cycles in Washita MOA with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.412025
N ₂ O	0.080386

Pollutant	Emissions Per Year (TONs)
CO ₂	9798.788386
CO ₂ e	9831.627407

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.412025
N ₂ O	0.080386

Pollutant	Emissions Per Year (TONs)
CO ₂	9798.788386
CO ₂ e	9831.627407

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 2,238
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 7.5
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 7.5
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2035, remove 18 T-38C Destination Cycles in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	18
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2035, remove 24 T-38C Destination Cycles in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004186
N ₂ O	-0.000817

Pollutant	Emissions Per Year (TONs)
CO ₂	-99.562915
CO ₂ e	-99.896584

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004186
N ₂ O	-0.000817

Pollutant	Emissions Per Year (TONs)
CO ₂	-99.562915
CO ₂ e	-99.896584

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 24
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

40. Aircraft

40.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2035, remove 280 T-38C Destination Cycles in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.047447
N ₂ O	-0.009257

Pollutant	Emissions Per Year (TONs)
CO ₂	-1128.379706
CO ₂ e	-1132.161284

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.047447
N ₂ O	-0.009257

Pollutant	Emissions Per Year (TONs)
CO ₂	-1128.379706
CO ₂ e	-1132.161284

40.2 Aircraft & Engines

40.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

40.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

40.3 Flight Operations

40.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	280
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

40.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

41. Aircraft

41.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2035, remove 28 T-38C Destination Cycles in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

41.2 Aircraft & Engines

41.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

41.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

41.3 Flight Operations

41.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	28
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

41.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

42. Aircraft

42.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2035, remove 34 T-38C Destination Cycles in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006100
N ₂ O	-0.001190

Pollutant	Emissions Per Year (TONs)
CO ₂	-145.077391
CO ₂ e	-145.563594

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006100
N ₂ O	-0.001190

Pollutant	Emissions Per Year (TONs)
CO ₂	-145.077391
CO ₂ e	-145.563594

42.2 Aircraft & Engines

42.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

42.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

42.3 Flight Operations

42.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 34
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

42.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

43. Aircraft

43.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2035, remove 172 T-38C Destination Cycles in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035146
N ₂ O	-0.006857

Pollutant	Emissions Per Year (TONs)
CO ₂	-835.854379
CO ₂ e	-838.655606

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035146
N ₂ O	-0.006857

Pollutant	Emissions Per Year (TONs)
CO ₂	-835.854379
CO ₂ e	-838.655606

43.2 Aircraft & Engines

43.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

43.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

43.3 Flight Operations

43.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	172
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

43.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

44. Aircraft

44.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2035, remove 62 T-38C Destination Cycles in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.011742
N ₂ O	-0.002291

Pollutant	Emissions Per Year (TONs)
CO ₂	-279.250272
CO ₂ e	-280.186133

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.011742
N ₂ O	-0.002291

Pollutant	Emissions Per Year (TONs)
CO ₂	-279.250272
CO ₂ e	-280.186133

44.2 Aircraft & Engines

44.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

44.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

44.3 Flight Operations

44.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	62
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

44.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

45. Aircraft

45.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2035, remove 1,377 T-38C Destination Cycles in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002221
N ₂ O	-0.000433

Pollutant	Emissions Per Year (TONs)
CO ₂	-52.823364
CO ₂ e	-53.000393

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002221
N ₂ O	-0.000433

Pollutant	Emissions Per Year (TONs)
CO ₂	-52.823364
CO ₂ e	-53.000393

45.2 Aircraft & Engines

45.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

45.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

45.3 Flight Operations

45.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,377
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

45.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

46. Aircraft

46.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2035, remove 92 T-38C Destination Cycles in Hollis MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006483
N ₂ O	-0.001265

Pollutant	Emissions Per Year (TONs)
CO ₂	-154.188294
CO ₂ e	-154.705031

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006483
N ₂ O	-0.001265

Pollutant	Emissions Per Year (TONs)
CO ₂	-154.188294
CO ₂ e	-154.705031

46.2 Aircraft & Engines

46.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

46.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

46.3 Flight Operations

46.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	92
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

46.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

47. Aircraft

47.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2035, remove 5,078 T-38C Destination Cycles in Westover 1 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.429426
N ₂ O	-0.083781

Pollutant	Emissions Per Year (TONs)
CO ₂	-10212.628162
CO ₂ e	-10246.854098

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.429426
N ₂ O	-0.083781

Pollutant	Emissions Per Year (TONs)
CO ₂	-10212.628162
CO ₂ e	-10246.854098

47.2 Aircraft & Engines

47.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

47.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

47.3 Flight Operations

47.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	5,078
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

47.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

48. Aircraft

48.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2035, remove 1,847 T-38C Destination Cycles in Westover 2 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.165075
N ₂ O	-0.032206

Pollutant	Emissions Per Year (TONs)
CO ₂	-3925.825234
CO ₂ e	-3938.981989

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.165075
N ₂ O	-0.032206

Pollutant	Emissions Per Year (TONs)
CO ₂	-3925.825234
CO ₂ e	-3938.981989

48.2 Aircraft & Engines

48.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

48.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

48.3 Flight Operations

48.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,847
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

48.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

49. Aircraft

49.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2035, remove 2,554 T-38C Destination Cycles in Washita MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.184153
N ₂ O	-0.035928

Pollutant	Emissions Per Year (TONs)
CO ₂	-4379.534677
CO ₂ e	-4394.211964

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.184153
N ₂ O	-0.035928

Pollutant	Emissions Per Year (TONs)
CO ₂	-4379.534677
CO ₂ e	-4394.211964

49.2 Aircraft & Engines

49.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

49.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

49.3 Flight Operations

49.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 2,554
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 7.5
 Climb Out [Intermediate] (mins): 10
 Takeoff [Military] (mins): 7.5
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

49.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)
AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)
AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)
AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)
AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

50. Aircraft

50.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2036, add 15 T-7A Destination Cycles in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003407
N ₂ O	0.000665

Pollutant	Emissions Per Year (TONs)
CO ₂	81.023006
CO ₂ e	81.294541

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003407
N ₂ O	0.000665

Pollutant	Emissions Per Year (TONs)
CO ₂	81.023006
CO ₂ e	81.294541

50.2 Aircraft & Engines

50.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

50.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

50.3 Flight Operations

50.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 15
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

50.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

51. Aircraft

51.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2036, add 20 T-7A Destination Cycles in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007949
N ₂ O	0.001551

Pollutant	Emissions Per Year (TONs)
CO ₂	189.053681
CO ₂ e	189.687263

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007949
N ₂ O	0.001551

Pollutant	Emissions Per Year (TONs)
CO ₂	189.053681
CO ₂ e	189.687263

51.2 Aircraft & Engines

51.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

51.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

51.3 Flight Operations

51.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	20
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

51.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

52. Aircraft

52.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2036, add 229 T-7A Destination Cycles in VR-159 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.088420
N ₂ O	0.017251

Pollutant	Emissions Per Year (TONs)
CO ₂	2102.817088
CO ₂ e	2109.864332

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.088420
N ₂ O	0.017251

Pollutant	Emissions Per Year (TONs)
CO ₂	2102.817088
CO ₂ e	2109.864332

52.2 Aircraft & Engines

52.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

52.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

52.3 Flight Operations

52.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 229
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

52.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

53. Aircraft

53.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Destination Cycles (VR-1141)

- **Activity Description:**

In 2036, add 23 T-7A Destination Cycles in VR-1141 with 108 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2036

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009403
N ₂ O	0.001835

Pollutant	Emissions Per Year (TONs)
CO ₂	223.623497
CO ₂ e	224.372934

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009403
N ₂ O	0.001835

Pollutant	Emissions Per Year (TONs)
CO ₂	223.623497
CO ₂ e	224.372934

53.2 Aircraft & Engines

53.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

53.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

53.3 Flight Operations

53.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	23
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

53.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

54. Aircraft

54.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2036, add 28 T-7A Destination Cycles in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011447
N ₂ O	0.002233

Pollutant	Emissions Per Year (TONs)
CO ₂	272.237301
CO ₂ e	273.149659

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011447
N ₂ O	0.002233

Pollutant	Emissions Per Year (TONs)
CO ₂	272.237301
CO ₂ e	273.149659

54.2 Aircraft & Engines

54.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

54.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

54.3 Flight Operations

54.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 28
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

54.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

55. Aircraft

55.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2036, add 141 T-7A Destination Cycles in VR-1143 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.065651
N ₂ O	0.012809

Pollutant	Emissions Per Year (TONs)
CO ₂	1561.313329
CO ₂ e	1566.545813

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.065651
N ₂ O	0.012809

Pollutant	Emissions Per Year (TONs)
CO ₂	1561.313329
CO ₂ e	1566.545813

55.2 Aircraft & Engines

55.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

55.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

55.3 Flight Operations

55.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 141
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

55.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

56. Aircraft

56.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2036, add 50 T-7A Destination Cycles in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.021577
N ₂ O	0.004210

Pollutant	Emissions Per Year (TONs)
CO ₂	513.145706
CO ₂ e	514.865429

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.021577
N ₂ O	0.004210

Pollutant	Emissions Per Year (TONs)
CO ₂	513.145706
CO ₂ e	514.865429

56.2 Aircraft & Engines

56.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

56.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

56.3 Flight Operations

56.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	50
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

56.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

57. Aircraft

57.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2036, add 1,128 T-7A Destination Cycles in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005037
N ₂ O	0.000983

Pollutant	Emissions Per Year (TONs)
CO ₂	119.781452
CO ₂ e	120.182880

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005037
N ₂ O	0.000983

Pollutant	Emissions Per Year (TONs)
CO ₂	119.781452
CO ₂ e	120.182880

57.2 Aircraft & Engines

57.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

57.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

57.3 Flight Operations

57.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 1128
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

57.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

58. Aircraft

58.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2036, add 75 T-7A Destination Cycles in Hollis MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011743
N ₂ O	0.002291

Pollutant	Emissions Per Year (TONs)
CO ₂	279.263886
CO ₂ e	280.199793

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.011743
N ₂ O	0.002291

Pollutant	Emissions Per Year (TONs)
CO ₂	279.263886
CO ₂ e	280.199793

58.2 Aircraft & Engines

58.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

58.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

58.3 Flight Operations

58.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	75
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

58.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

59. Aircraft

59.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2036, add 4,159 T-7A Destination Cycles in Westover 1 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.781402
N ₂ O	0.152452

Pollutant	Emissions Per Year (TONs)
CO ₂	18583.336050
CO ₂ e	18645.615031

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.781402
N ₂ O	0.152452

Pollutant	Emissions Per Year (TONs)
CO ₂	18583.336050
CO ₂ e	18645.615031

59.2 Aircraft & Engines

59.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

59.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

59.3 Flight Operations

59.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 4,159
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 5.4
Takeoff [Military] (mins): 7.2
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

59.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

60. Aircraft

60.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2036, add 1,062 T-7A Destination Cycles in Westover 2 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.206232
N ₂ O	0.040236

Pollutant	Emissions Per Year (TONs)
CO ₂	4904.621142
CO ₂ e	4921.058169

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.206232
N ₂ O	0.040236

Pollutant	Emissions Per Year (TONs)
CO ₂	4904.621142
CO ₂ e	4921.058169

60.2 Aircraft & Engines

60.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

60.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

60.3 Flight Operations

60.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,062
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

60.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

61. Aircraft

61.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2036, add 2,092 T-7A Destination Cycles in Washita MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.385146
N ₂ O	0.075142

Pollutant	Emissions Per Year (TONs)
CO ₂	9159.546606
CO ₂ e	9190.243313

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.385146
N ₂ O	0.075142

Pollutant	Emissions Per Year (TONs)
CO ₂	9159.546606
CO ₂ e	9190.243313

61.2 Aircraft & Engines

61.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

61.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

61.3 Flight Operations

61.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	2,092
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

61.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

62. Aircraft

62.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2036, remove 18 T-38C Destination Cycles in IR-103 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001794
N ₂ O	-0.000350

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.669821
CO ₂ e	-42.812822

62.2 Aircraft & Engines

62.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

62.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

62.3 Flight Operations

62.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 18
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

62.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

63. Aircraft

63.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2036, remove 25 T-38C Destination Cycles in VR-158 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004361
N ₂ O	-0.000851

Pollutant	Emissions Per Year (TONs)
CO ₂	-103.711370
CO ₂ e	-104.058942

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004361
N ₂ O	-0.000851

Pollutant	Emissions Per Year (TONs)
CO ₂	-103.711370
CO ₂ e	-104.058942

63.2 Aircraft & Engines

63.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

63.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

63.3 Flight Operations

63.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	25
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

63.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

64. Aircraft

64.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2036, remove 287 T-38C Destination Cycles in VR-159 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.048633
N ₂ O	-0.009488

Pollutant	Emissions Per Year (TONs)
CO ₂	-1156.589198
CO ₂ e	-1160.465316

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.048633
N ₂ O	-0.009488

Pollutant	Emissions Per Year (TONs)
CO ₂	-1156.589198
CO ₂ e	-1160.465316

64.2 Aircraft & Engines

64.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

64.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

64.3 Flight Operations

64.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	287
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

64.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

65. Aircraft

65.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2036, remove 28 T-38C Destination Cycles in VR-1141 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

65.2 Aircraft & Engines

65.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

65.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

65.3 Flight Operations

65.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 28
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

65.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

66. Aircraft

66.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Remove T-38C MTR Destination Cycles (VR-1142)

- **Activity Description:**

In 2036, remove 35 T-38C Destination Cycles in VR-1142 with 56 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2036

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006280
N ₂ O	-0.001225

Pollutant	Emissions Per Year (TONs)
CO ₂	-149.344373
CO ₂ e	-149.844876

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006280
N ₂ O	-0.001225

Pollutant	Emissions Per Year (TONs)
CO ₂	-149.344373
CO ₂ e	-149.844876

66.2 Aircraft & Engines

66.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

66.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

66.3 Flight Operations

66.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	35
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

66.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

67. Aircraft

67.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2036, remove 176 T-38C Destination Cycles in VR-1143 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035964
N ₂ O	-0.007017

Pollutant	Emissions Per Year (TONs)
CO ₂	-855.292852
CO ₂ e	-858.159225

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.035964
N ₂ O	-0.007017

Pollutant	Emissions Per Year (TONs)
CO ₂	-855.292852
CO ₂ e	-858.159225

67.2 Aircraft & Engines

67.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

67.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

67.3 Flight Operations

67.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 176
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 41
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

67.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

68. Aircraft

68.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2036, remove 63 T-38C Destination Cycles in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.011931
N ₂ O	-0.002328

Pollutant	Emissions Per Year (TONs)
CO ₂	-283.754308
CO ₂ e	-284.705264

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.011931
N ₂ O	-0.002328

Pollutant	Emissions Per Year (TONs)
CO ₂	-283.754308
CO ₂ e	-284.705264

68.2 Aircraft & Engines

68.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

68.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

68.3 Flight Operations

68.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56

Flight Operation Cycle Type: DC (Destination Cycle)

Number of Annual Flight Operation Cycles for all Aircraft: 63

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0

Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins): 38

Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0

Approach (mins): 0

Intermediate (mins): 0

Military (mins): 0

Afterburn (mins): 0

68.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

69. Aircraft

69.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2036, remove 1,410 T-38C Destination Cycles in R-5601 Falcon Range with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002274
N ₂ O	-0.000444

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.089284
CO ₂ e	-54.270555

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002274
N ₂ O	-0.000444

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.089284
CO ₂ e	-54.270555

69.2 Aircraft & Engines

69.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

69.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

69.3 Flight Operations

69.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,410
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

69.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

70. Aircraft

70.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2036, remove 94 T-38C Destination Cycles in Hollis MOA with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006624
N ₂ O	-0.001292

Pollutant	Emissions Per Year (TONs)
CO ₂	-157.540214
CO ₂ e	-158.068184

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.006624
N ₂ O	-0.001292

Pollutant	Emissions Per Year (TONs)
CO ₂	-157.540214
CO ₂ e	-158.068184

70.2 Aircraft & Engines

70.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

70.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

70.3 Flight Operations

70.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 94
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

70.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

71. Aircraft

71.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2036, remove 5,199 T-38C Destination Cycles in Westover 1 MOA with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.439659
N ₂ O	-0.085778

Pollutant	Emissions Per Year (TONs)
CO ₂	-10455.977514
CO ₂ e	-10491.018995

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.439659
N ₂ O	-0.085778

Pollutant	Emissions Per Year (TONs)
CO ₂	-10455.977514
CO ₂ e	-10491.018995

71.2 Aircraft & Engines

71.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

71.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

71.3 Flight Operations

71.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	5,199
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

71.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

72. Aircraft

72.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2036, remove 778 T-38C Destination Cycles in Westover 2 MOA with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.069534
N ₂ O	-0.013566

Pollutant	Emissions Per Year (TONs)
CO ₂	-1653.650261
CO ₂ e	-1659.192197

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.069534
N ₂ O	-0.013566

Pollutant	Emissions Per Year (TONs)
CO ₂	-1653.650261
CO ₂ e	-1659.192197

72.2 Aircraft & Engines

72.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

72.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

72.3 Flight Operations

72.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	778
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

72.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

73. Aircraft

73.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2036, remove 2,615 T-38C Destination Cycles in Washita MOA with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.188551
N ₂ O	-0.036786

Pollutant	Emissions Per Year (TONs)
CO ₂	-4484.135936
CO ₂ e	-4499.163777

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.188551
N ₂ O	-0.036786

Pollutant	Emissions Per Year (TONs)
CO ₂	-4484.135936
CO ₂ e	-4499.163777

73.2 Aircraft & Engines

73.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

73.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

73.3 Flight Operations

73.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 2,615
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 7.5
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 7.5
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

73.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

74. Aircraft

74.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2037, add 2 T-7A Destination Cycles in IR-103 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000454
N ₂ O	0.000089

Pollutant	Emissions Per Year (TONs)
CO ₂	10.803067
CO ₂ e	10.839272

74.2 Aircraft & Engines

74.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

74.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

74.3 Flight Operations

74.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	2
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

74.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

75. Aircraft

75.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2037, add 3 T-7A Destination Cycles in VR-158 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001192
N ₂ O	0.000233

Pollutant	Emissions Per Year (TONs)
CO ₂	28.358052
CO ₂ e	28.453089

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001192
N ₂ O	0.000233

Pollutant	Emissions Per Year (TONs)
CO ₂	28.358052
CO ₂ e	28.453089

75.2 Aircraft & Engines

75.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

75.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

75.3 Flight Operations

75.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 3
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

75.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

76. Aircraft

76.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2037, add 37 T-7A Destination Cycles in VR-159 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014286
N ₂ O	0.002787

Pollutant	Emissions Per Year (TONs)
CO ₂	339.756473
CO ₂ e	340.895110

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014286
N ₂ O	0.002787

Pollutant	Emissions Per Year (TONs)
CO ₂	339.756473
CO ₂ e	340.895110

76.2 Aircraft & Engines

76.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

76.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

76.3 Flight Operations

76.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 37
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

76.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

77. Aircraft

77.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2037, add 4 T-7A Destination Cycles in VR-1141 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001635
N ₂ O	0.000319

Pollutant	Emissions Per Year (TONs)
CO ₂	38.891043
CO ₂ e	39.021380

77.2 Aircraft & Engines

77.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

77.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

77.3 Flight Operations

77.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

77.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

78. Aircraft

78.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2037, add 5 T-7A Destination Cycles in VR-1142 with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

78.2 Aircraft & Engines

78.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

78.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

78.3 Flight Operations

78.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 5
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

78.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

79. Aircraft

79.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2037: Add T-7A MTR Destination Cycles (VR-1143)

- **Activity Description:**

In 2037, add 23 T-7A Destination Cycles in VR-1143 with 108 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2037

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010709
N ₂ O	0.002089

Pollutant	Emissions Per Year (TONs)
CO ₂	254.682316
CO ₂ e	255.535842

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010709
N ₂ O	0.002089

Pollutant	Emissions Per Year (TONs)
CO ₂	254.682316
CO ₂ e	255.535842

79.2 Aircraft & Engines

79.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

79.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

79.3 Flight Operations

79.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	23
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

79.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

80. Aircraft

80.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2037, add 8 T-7A Destination Cycles in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003452
N ₂ O	0.000674

Pollutant	Emissions Per Year (TONs)
CO ₂	82.103313
CO ₂ e	82.378469

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003452
N ₂ O	0.000674

Pollutant	Emissions Per Year (TONs)
CO ₂	82.103313
CO ₂ e	82.378469

80.2 Aircraft & Engines

80.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

80.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

80.3 Flight Operations

80.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 8
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

80.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

81. Aircraft

81.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2037, add 184 T-7A Destination Cycles in R-5601 Falcon Range with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000822
N ₂ O	0.000160

Pollutant	Emissions Per Year (TONs)
CO ₂	19.538818
CO ₂ e	19.604300

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000822
N ₂ O	0.000160

Pollutant	Emissions Per Year (TONs)
CO ₂	19.538818
CO ₂ e	19.604300

81.2 Aircraft & Engines

81.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

81.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

81.3 Flight Operations

81.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 184
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

81.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1 000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

82. Aircraft

82.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2037, add 12 T-7A Destination Cycles in Hollis MOA with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001879
N ₂ O	0.000367

Pollutant	Emissions Per Year (TONs)
CO ₂	44.682222
CO ₂ e	44.831967

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001879
N ₂ O	0.000367

Pollutant	Emissions Per Year (TONs)
CO ₂	44.682222
CO ₂ e	44.831967

82.2 Aircraft & Engines

82.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

82.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

82.3 Flight Operations

82.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	12
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

82.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

83. Aircraft

83.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2037, add 677 T-7A Destination Cycles in Westover 1 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.127196
N ₂ O	0.024816

Pollutant	Emissions Per Year (TONs)
CO ₂	3024.986416
CO ₂ e	3035.124159

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.127196
N ₂ O	0.024816

Pollutant	Emissions Per Year (TONs)
CO ₂	3024.986416
CO ₂ e	3035.124159

83.2 Aircraft & Engines

83.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

83.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

83.3 Flight Operations

83.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 677
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 23.4
 Climb Out [Intermediate] (mins): 5.4
 Takeoff [Military] (mins): 7.2
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

83.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

84. Aircraft

84.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2037, add 173 T-7A Destination Cycles in Westover 2 MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.033595
N ₂ O	0.006554

Pollutant	Emissions Per Year (TONs)
CO ₂	798.963708
CO ₂ e	801.641303

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.033595
N ₂ O	0.006554

Pollutant	Emissions Per Year (TONs)
CO ₂	798.963708
CO ₂ e	801.641303

84.2 Aircraft & Engines

84.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

84.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

84.3 Flight Operations

84.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	108
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	173
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

84.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

85. Aircraft

85.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2037, add 341 T-7A Destination Cycles in Washita MOA with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.062779
N ₂ O	0.012248

Pollutant	Emissions Per Year (TONs)
CO ₂	1493.023610
CO ₂ e	1498.027232

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.062779
N ₂ O	0.012248

Pollutant	Emissions Per Year (TONs)
CO ₂	1493.023610
CO ₂ e	1498.027232

85.2 Aircraft & Engines

85.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

85.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

85.3 Flight Operations

85.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 341
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 7.5
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 7.5
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

85.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

86. Aircraft

86.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2037, remove 7 T-38C Destination Cycles in VR-158 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001221
N ₂ O	-0.000238

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.039184
CO ₂ e	-29.136504

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001221
N ₂ O	-0.000238

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.039184
CO ₂ e	-29.136504

86.2 Aircraft & Engines

86.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

86.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

86.3 Flight Operations

86.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	7
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

86.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

87. Aircraft

87.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2037, remove 76 T-38C Destination Cycles in VR-159 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.012878
N ₂ O	-0.002513

Pollutant	Emissions Per Year (TONs)
CO ₂	-306.274492
CO ₂ e	-307.300920

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.012878
N ₂ O	-0.002513

Pollutant	Emissions Per Year (TONs)
CO ₂	-306.274492
CO ₂ e	-307.300920

87.2 Aircraft & Engines

87.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

87.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

87.3 Flight Operations

87.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 76
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 34
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

87.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

88. Aircraft

88.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2037, remove 7 T-38C Destination Cycles in VR-1141 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

88.2 Aircraft & Engines

88.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

88.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

88.3 Flight Operations

88.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	7
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

88.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

89. Aircraft

89.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2037, remove 9 T-38C Destination Cycles in VR-1142 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001615
N ₂ O	-0.000315

Pollutant	Emissions Per Year (TONs)
CO ₂	-38.402839
CO ₂ e	-38.531539

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001615
N ₂ O	-0.000315

Pollutant	Emissions Per Year (TONs)
CO ₂	-38.402839
CO ₂ e	-38.531539

89.2 Aircraft & Engines

89.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

89.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

89.3 Flight Operations

89.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	9
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

89.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

90. Aircraft

90.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2037, remove 47 T-38C Destination Cycles in VR-1143 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009604
N ₂ O	-0.001874

Pollutant	Emissions Per Year (TONs)
CO ₂	-228.402069
CO ₂ e	-229.167520

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009604
N ₂ O	-0.001874

Pollutant	Emissions Per Year (TONs)
CO ₂	-228.402069
CO ₂ e	-229.167520

90.2 Aircraft & Engines

90.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

90.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

90.3 Flight Operations

90.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 47
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

90.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

91. Aircraft

91.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2037, remove 17 T-38C Destination Cycles in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003220
N ₂ O	-0.000628

Pollutant	Emissions Per Year (TONs)
CO ₂	-76.568623
CO ₂ e	-76.825230

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003220
N ₂ O	-0.000628

Pollutant	Emissions Per Year (TONs)
CO ₂	-76.568623
CO ₂ e	-76.825230

91.2 Aircraft & Engines

91.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

91.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

91.3 Flight Operations

91.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	17
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

91.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

92. Aircraft

92.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2037, remove 374 T-38C Destination Cycles in R-5601 Falcon Range with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000603
N ₂ O	-0.000118

Pollutant	Emissions Per Year (TONs)
CO ₂	-14.347087
CO ₂ e	-14.395168

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000603
N ₂ O	-0.000118

Pollutant	Emissions Per Year (TONs)
CO ₂	-14.347087
CO ₂ e	-14.395168

92.2 Aircraft & Engines

92.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

92.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

92.3 Flight Operations

92.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 374
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

92.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

93. Aircraft

93.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX;
Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2037, remove 25 T-38C Destination Cycles in Hollis MOA with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001762
N ₂ O	-0.000344

Pollutant	Emissions Per Year (TONs)
CO ₂	-41.898993
CO ₂ e	-42.039411

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001762
N ₂ O	-0.000344

Pollutant	Emissions Per Year (TONs)
CO ₂	-41.898993
CO ₂ e	-42.039411

93.2 Aircraft & Engines

93.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

93.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

93.3 Flight Operations

93.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47

Flight Operation Cycle Type: DC (Destination Cycle)

Number of Annual Flight Operation Cycles for all Aircraft: 25

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

93.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

94. Aircraft

94.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2037: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2037, remove 1,378 T-38C Destination Cycles in Westover 1 MOA with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.116532
N ₂ O	-0.022735

Pollutant	Emissions Per Year (TONs)
CO ₂	-2771.366996
CO ₂ e	-2780.654775

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.116532
N ₂ O	-0.022735

Pollutant	Emissions Per Year (TONs)
CO ₂	-2771.366996
CO ₂ e	-2780.654775

94.2 Aircraft & Engines

94.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

94.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

94.3 Flight Operations

94.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,378
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

94.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

95. Aircraft

95.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2037, remove 352 T-38C Destination Cycles in Westover 2 MOA with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.031460
N ₂ O	-0.006138

Pollutant	Emissions Per Year (TONs)
CO ₂	-748.181095
CO ₂ e	-750.688500

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.031460
N ₂ O	-0.006138

Pollutant	Emissions Per Year (TONs)
CO ₂	-748.181095
CO ₂ e	-750.688500

95.2 Aircraft & Engines

95.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

95.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

95.3 Flight Operations

95.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 352
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

95.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

96. Aircraft

96.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2037, remove 693 T-38C Destination Cycles in Washita MOA with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.049968
N ₂ O	-0.009749

Pollutant	Emissions Per Year (TONs)
CO ₂	-1188.338893
CO ₂ e	-1192.321414

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.049968
N ₂ O	-0.009749

Pollutant	Emissions Per Year (TONs)
CO ₂	-1188.338893
CO ₂ e	-1192.321414

96.2 Aircraft & Engines

96.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

96.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

96.3 Flight Operations

96.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	693
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

96.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

97. Aircraft

97.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2037, remove 5 T-38C Destination Cycles in IR-103 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000498
N ₂ O	-0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.852728
CO ₂ e	-11.892450

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000498
N ₂ O	-0.000097

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.852728
CO ₂ e	-11.892450

97.2 Aircraft & Engines

97.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

97.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

97.3 Flight Operations

97.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 5
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

97.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

SUA ROI: Alternative 3 ACAM Report (Low Flight Patterns)

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3, SUA Low Flight Pattern

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

☐ applicable
☒ not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving “steady state” (i.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts on local air quality. The insignificance indicators are trivial (*de minimis*) rate thresholds that have been demonstrated to have little to no impact on air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (i.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2034

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.666	250	No
NOx	10.872	250	No
CO	-3.467	250	No
SOx	0.223	250	No
PM 10	-0.095	250	No
PM 2.5	-0.086	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2035

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	3.139	250	No
NOx	52.841	250	No
CO	-21.591	250	No
SOx	0.931	250	No
PM 10	-0.630	250	No
PM 2.5	-0.568	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2036

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.719	250	No
NOx	96.526	250	No
CO	-40.156	250	No
SOx	1.677	250	No
PM 10	-1.177	250	No
PM 2.5	-1.061	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2037

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	7.198	250	No
NOx	119.616	250	No
CO	-44.398	250	No
SOx	2.251	250	No
PM 10	-1.265	250	No
PM 2.5	-1.142	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	7.198	250	No
NOx	119.616	250	No
CO	-44.398	250	No
SOx	2.251	250	No
PM 10	-1.265	250	No
PM 2.5	-1.142	250	No
Pb	0.000	25	No
NH3	0.000	250	No

None of the estimated annual net emissions associated with this action are above the insignificance indicators; therefore, the action will not cause or contribute to an exceedance of one or more NAAQSs and will have an insignificant impact on air quality. No further air assessment is needed.

Carolyn Hein, Contractor

May 12, 2025

Name, Title

Date

SUA ROI: Alternative 3 ACAM Detail Report (Low Flight Patterns)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3, SUA Low Flight Pattern

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite

repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (IR-103)
3.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-158)
4.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-159)
5.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1141)
6.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1142)
7.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1143)
8.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1146)
9.	Aircraft	2034: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
10.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (IR-103)
11.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-158)
12.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-159)
13.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1141)
14.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1142)
15.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1143)
16.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)
17.	Aircraft	2034: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
18.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (IR-103)
19.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-158)
20.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-159)
21.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1141)
22.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1142)
23.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1143)
24.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1146)
25.	Aircraft	2035: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
26.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (IR-103)
27.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-158)
28.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-159)
29.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1141)
30.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1142)
31.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1143)
32.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)
33.	Aircraft	2035: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
34.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (IR-103)
35.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-158)
36.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-159)
37.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1141)
38.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1142)
39.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1143)
40.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1146)

41.	Aircraft	2036: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
42.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (IR-103)
43.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-158)
44.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-159)
45.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1141)
46.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1142)
47.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1143)
48.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)
49.	Aircraft	2036: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
50.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (IR-103)
51.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-158)
52.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-159)
53.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1141)
54.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1142)
55.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1143)
56.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1146)
57.	Aircraft	2037: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)
58.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-158)
59.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-159)
60.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1141)
61.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1142)
62.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1143)
63.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)
64.	Aircraft	2037: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)
65.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (IR-103)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2034, add 3 T-7A Low-Altitude Operations in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.011483
SO _x	0.005413
NO _x	0.166931
CO	0.009510

Pollutant	Emissions Per Year (TONs)
PM 10	0.000809
PM 2.5	0.000708
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.011483
SO _x	0.005413
NO _x	0.166931
CO	0.009510

Pollutant	Emissions Per Year (TONs)
PM 10	0.000809
PM 2.5	0.000708
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 3
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2034, add 4 T-7A Low-Altitude Operations in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.026793
SO _x	0.012629
NO _x	0.389505
CO	0.022190

Pollutant	Emissions Per Year (TONs)
PM 10	0.001889
PM 2.5	0.001652
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.026793
SO _x	0.012629
NO _x	0.389505
CO	0.022190

Pollutant	Emissions Per Year (TONs)
PM 10	0.001889
PM 2.5	0.001652
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2034, add 51 T-7A Low-Altitude Operations in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.331853
SO _x	0.156424
NO _x	4.824291
CO	0.274838

Pollutant	Emissions Per Year (TONs)
PM 10	0.023391
PM 2.5	0.020467
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.331853
SO _x	0.156424
NO _x	4.824291
CO	0.274838

Pollutant	Emissions Per Year (TONs)
PM 10	0.023391
PM 2.5	0.020467
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 51
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MTR Low-Altitude Operations (VR-1141)

- **Activity Description:**

In 2034, add 5 T-7A Low-Altitude Operations in VR-1141 with 28 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2034

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.034448
SO _x	0.016238
NO _x	0.500792
CO	0.028530

Pollutant	Emissions Per Year (TONs)
PM 10	0.002428
PM 2.5	0.002125
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.034448
SO _x	0.016238
NO _x	0.500792
CO	0.028530

Pollutant	Emissions Per Year (TONs)
PM 10	0.002428
PM 2.5	0.002125
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2034, add 6 T-7A Low-Altitude Operations in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.041338
SO _x	0.019485
NO _x	0.600950
CO	0.034236

Pollutant	Emissions Per Year (TONs)
PM 10	0.002914
PM 2.5	0.002549
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.041338
SO _x	0.019485
NO _x	0.600950
CO	0.034236

Pollutant	Emissions Per Year (TONs)
PM 10	0.002914
PM 2.5	0.002549
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 6
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2034, add 31 T-7A Low-Altitude Operations in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.243244
SO _x	0.114657
NO _x	3.536144
CO	0.201453

Pollutant	Emissions Per Year (TONs)
PM 10	0.017145
PM 2.5	0.015002
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.243244
SO _x	0.114657
NO _x	3.536144
CO	0.201453

Pollutant	Emissions Per Year (TONs)
PM 10	0.017145
PM 2.5	0.015002
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 31
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 10 T-7A Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	10
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2034, add 101 T-7A Low-Altitude Operations in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.006440
SO _x	0.003582
NO _x	0.045751
CO	0.010157

Pollutant	Emissions Per Year (TONs)
PM 10	0.000386
PM 2.5	0.000327
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000451
N ₂ O	0.000088

Pollutant	Emissions Per Year (TONs)
CO ₂	10.725112
CO ₂ e	10.761056

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.006440
SO _x	0.003582
NO _x	0.045751
CO	0.010157

Pollutant	Emissions Per Year (TONs)
PM 10	0.000386
PM 2.5	0.000327
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000451
N ₂ O	0.000088

Pollutant	Emissions Per Year (TONs)
CO ₂	10.725112
CO ₂ e	10.761056

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 101
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2034, remove 3 T-38C Low-Altitude Operations in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.001665
SO _x	-0.002375
NO _x	-0.004262
CO	-0.068798

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002509
PM 2.5	-0.002242
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.001665
SO _x	-0.002375
NO _x	-0.004262
CO	-0.068798

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002509
PM 2.5	-0.002242
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

10.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	3
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2034, remove 4 T-38C Low-Altitude Operations in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003885
SO _x	-0.005543
NO _x	-0.009946
CO	-0.160528

Pollutant	Emissions Per Year (TONs)
PM 10	-0.005853
PM 2.5	-0.005232
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003885
SO _x	-0.005543
NO _x	-0.009946
CO	-0.160528

Pollutant	Emissions Per Year (TONs)
PM 10	-0.005853
PM 2.5	-0.005232
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

11.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 4
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

11.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2034, remove 45 T-38C Low-Altitude Operations in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042458
SO _x	-0.060573
NO _x	-0.108691
CO	-1.754344

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063969
PM 2.5	-0.057176
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042458
SO _x	-0.060573
NO _x	-0.108691
CO	-1.754344

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063969
PM 2.5	-0.057176
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

12.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131

Flight Operation Cycle Type: LFP (Low Flight Pattern)

Number of Annual Flight Operation Cycles for all Aircraft: 45

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0

Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins): 34

Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0

Approach (mins): 0

Intermediate (mins): 0

Military (mins): 0

Afterburn (mins): 0

12.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2034, remove 4 T-38C Low-Altitude Operations in VR-1141 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003996
SO _x	-0.005701
NO _x	-0.010230
CO	-0.165115

Pollutant	Emissions Per Year (TONs)
PM 10	-0.006021
PM 2.5	-0.005381
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.003996
SO _x	-0.005701
NO _x	-0.010230
CO	-0.165115

Pollutant	Emissions Per Year (TONs)
PM 10	-0.006021
PM 2.5	-0.005381
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

13.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

13.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2034, remove 5 T-38C Low-Altitude Operations in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004995
SO _x	-0.007126
NO _x	-0.012787
CO	-0.206393

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007526
PM 2.5	-0.006727
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004995
SO _x	-0.007126
NO _x	-0.012787
CO	-0.206393

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007526
PM 2.5	-0.006727
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

14.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 5
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

14.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2034, remove 27 T-38C Low-Altitude Operations in VR-1143 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.030719
SO _x	-0.043826
NO _x	-0.078641
CO	-1.269319

Pollutant	Emissions Per Year (TONs)
PM 10	-0.046284
PM 2.5	-0.041369
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.030719
SO _x	-0.043826
NO _x	-0.078641
CO	-1.269319

Pollutant	Emissions Per Year (TONs)
PM 10	-0.046284
PM 2.5	-0.041369
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

15.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	27
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

15.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

16. Aircraft

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, remove 9 T-38C Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

16.2 Aircraft & Engines

16.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

16.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

16.3 Flight Operations

16.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	9
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

16.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

17. Aircraft

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2034, remove 89 T-38C Low-Altitude Operations in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005080
SO _x	-0.001140
NO _x	-0.000803
CO	-0.091491

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002165
PM 2.5	-0.001945
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000144
N ₂ O	-0.000028

Pollutant	Emissions Per Year (TONs)
CO ₂	-3.414146
CO ₂ e	-3.425588

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005080
SO _x	-0.001140
NO _x	-0.000803
CO	-0.091491

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002165
PM 2.5	-0.001945
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000144
N ₂ O	-0.000028

Pollutant	Emissions Per Year (TONs)
CO ₂	-3.414146
CO ₂ e	-3.425588

17.2 Aircraft & Engines

17.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

17.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

17.3 Flight Operations

17.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 89
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

17.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2035, add 13 T-7A Low-Altitude Operations in IR-103 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.049759
SO _x	0.023455
NO _x	0.723366
CO	0.041210

Pollutant	Emissions Per Year (TONs)
PM 10	0.003507
PM 2.5	0.003069
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.049759
SO _x	0.023455
NO _x	0.723366
CO	0.041210

Pollutant	Emissions Per Year (TONs)
PM 10	0.003507
PM 2.5	0.003069
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

18.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	13
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

18.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2035, add 16 T-7A Low-Altitude Operations in VR-158 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.107173
SO _x	0.050518
NO _x	1.558018
CO	0.088760

Pollutant	Emissions Per Year (TONs)
PM 10	0.007554
PM 2.5	0.006610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.107173
SO _x	0.050518
NO _x	1.558018
CO	0.088760

Pollutant	Emissions Per Year (TONs)
PM 10	0.007554
PM 2.5	0.006610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

19.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

19.3 Flight Operations

19.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 16
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

19.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

20. Aircraft

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2035, add 196 T-7A Low-Altitude Operations in VR-159 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.275356
SO _x	0.601159
NO _x	18.540414
CO	1.056242

Pollutant	Emissions Per Year (TONs)
PM 10	0.089893
PM 2.5	0.078656
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.275356
SO _x	0.601159
NO _x	18.540414
CO	1.056242

Pollutant	Emissions Per Year (TONs)
PM 10	0.089893
PM 2.5	0.078656
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

20.2 Aircraft & Engines

20.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

20.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

20.3 Flight Operations

20.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 196
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

20.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

21. Aircraft

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2035, add 19 T-7A Low-Altitude Operations in VR-1141 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.130904
SO _x	0.061704
NO _x	1.903008
CO	0.108414

Pollutant	Emissions Per Year (TONs)
PM 10	0.009227
PM 2.5	0.008073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.130904
SO _x	0.061704
NO _x	1.903008
CO	0.108414

Pollutant	Emissions Per Year (TONs)
PM 10	0.009227
PM 2.5	0.008073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

21.2 Aircraft & Engines

21.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

21.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

21.3 Flight Operations

21.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	19
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

21.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

22. Aircraft

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2035, add 24 T-7A Low-Altitude Operations in VR-1142 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.165352
SO _x	0.077941
NO _x	2.403799
CO	0.136944

Pollutant	Emissions Per Year (TONs)
PM 10	0.011655
PM 2.5	0.010198
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.165352
SO _x	0.077941
NO _x	2.403799
CO	0.136944

Pollutant	Emissions Per Year (TONs)
PM 10	0.011655
PM 2.5	0.010198
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

22.2 Aircraft & Engines

22.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

22.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

22.3 Flight Operations

22.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 24
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

22.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

23. Aircraft

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2035, add 120 T-7A Low-Altitude Operations in VR-1143 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.941589
SO _x	0.443833
NO _x	13.688301
CO	0.779818

Pollutant	Emissions Per Year (TONs)
PM 10	0.066368
PM 2.5	0.058072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.941589
SO _x	0.443833
NO _x	13.688301
CO	0.779818

Pollutant	Emissions Per Year (TONs)
PM 10	0.066368
PM 2.5	0.058072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

23.2 Aircraft & Engines

23.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

23.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

23.3 Flight Operations

23.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 120
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

23.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, add 40 T-7A Low-Altitude Operations in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1
 Start Year: 2035

- Activity End Date

Indefinite: Yes
 End Month: N/A
 End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	40
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2035, add 389 T-7A Low-Altitude Operations in R-5601 Falcon Range with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.024804
SO _x	0.013797
NO _x	0.176211
CO	0.039118

Pollutant	Emissions Per Year (TONs)
PM 10	0.001488
PM 2.5	0.001261
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001737
N ₂ O	0.000339

Pollutant	Emissions Per Year (TONs)
CO ₂	41.307611
CO ₂ e	41.446046

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.024804
SO _x	0.013797
NO _x	0.176211
CO	0.039118

Pollutant	Emissions Per Year (TONs)
PM 10	0.001488
PM 2.5	0.001261
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001737
N ₂ O	0.000339

Pollutant	Emissions Per Year (TONs)
CO ₂	41.307611
CO ₂ e	41.446046

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 389
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2035, remove 14 T-38C Low-Altitude Operations in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.007770
SO _x	-0.011085
NO _x	-0.019891
CO	-0.321056

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011707
PM 2.5	-0.010464
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.007770
SO _x	-0.011085
NO _x	-0.019891
CO	-0.321056

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011707
PM 2.5	-0.010464
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	14
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2035, remove 18 T-38C Low-Altitude Operations in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 18
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2035, remove 224 T-38C Low-Altitude Operations in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.211344
SO _x	-0.301517
NO _x	-0.541041
CO	-8.732734

Pollutant	Emissions Per Year (TONs)
PM 10	-0.318425
PM 2.5	-0.284610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.211344
SO _x	-0.301517
NO _x	-0.541041
CO	-8.732734

Pollutant	Emissions Per Year (TONs)
PM 10	-0.318425
PM 2.5	-0.284610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	224
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2035, remove 21 T-38C Low-Altitude Operations in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.020979
SO _x	-0.029930
NO _x	-0.053706
CO	-0.866852

Pollutant	Emissions Per Year (TONs)
PM 10	-0.031608
PM 2.5	-0.028252
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003768
N ₂ O	-0.000735

Pollutant	Emissions Per Year (TONs)
CO ₂	-89.606624
CO ₂ e	-89.906925

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.020979
SO _x	-0.029930
NO _x	-0.053706
CO	-0.866852

Pollutant	Emissions Per Year (TONs)
PM 10	-0.031608
PM 2.5	-0.028252
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003768
N ₂ O	-0.000735

Pollutant	Emissions Per Year (TONs)
CO ₂	-89.606624
CO ₂ e	-89.906925

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	21
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2035, remove 27 T-38C Low-Altitude Operations in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.026973
SO _x	-0.038481
NO _x	-0.069051
CO	-1.114524

Pollutant	Emissions Per Year (TONs)
PM 10	-0.040639
PM 2.5	-0.036324
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.026973
SO _x	-0.038481
NO _x	-0.069051
CO	-1.114524

Pollutant	Emissions Per Year (TONs)
PM 10	-0.040639
PM 2.5	-0.036324
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 27
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2035, remove 137 T-38C Low-Altitude Operations in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.155872
SO _x	-0.222377
NO _x	-0.399032
CO	-6.440621

Pollutant	Emissions Per Year (TONs)
PM 10	-0.234847
PM 2.5	-0.209907
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.155872
SO _x	-0.222377
NO _x	-0.399032
CO	-6.440621

Pollutant	Emissions Per Year (TONs)
PM 10	-0.234847
PM 2.5	-0.209907
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	137
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, remove 45 T-38C Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	45
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2035, remove 444 T-38C Low-Altitude Operations in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025345
SO _x	-0.005689
NO _x	-0.004007
CO	-0.456427

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010802
PM 2.5	-0.009702
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000716
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.032370
CO ₂ e	-17.089451

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025345
SO _x	-0.005689
NO _x	-0.004007
CO	-0.456427

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010802
PM 2.5	-0.009702
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000716
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.032370
CO ₂ e	-17.089451

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 444
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2036, add 13 T-7A Low-Altitude Operations in IR-103 with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.049759
SO _x	0.023455
NO _x	0.723366
CO	0.041210

Pollutant	Emissions Per Year (TONs)
PM 10	0.003507
PM 2.5	0.003069
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.049759
SO _x	0.023455
NO _x	0.723366
CO	0.041210

Pollutant	Emissions Per Year (TONs)
PM 10	0.003507
PM 2.5	0.003069
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	13
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2036, add 16 T-7A Low-Altitude Operations in VR-158 with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.107173
SO _x	0.050518
NO _x	1.558018
CO	0.088760

Pollutant	Emissions Per Year (TONs)
PM 10	0.007554
PM 2.5	0.006610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.107173
SO _x	0.050518
NO _x	1.558018
CO	0.088760

Pollutant	Emissions Per Year (TONs)
PM 10	0.007554
PM 2.5	0.006610
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006360
N ₂ O	0.001241

Pollutant	Emissions Per Year (TONs)
CO ₂	151.242945
CO ₂ e	151.749811

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 16
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Low-Altitude Operations (VR-159)

- **Activity Description:**

In 2036, add 205 T-7A Low-Altitude Operations in VR-159 with 124 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2036

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	1.333918
SO _x	0.628763
NO _x	19.391760
CO	1.104743

Pollutant	Emissions Per Year (TONs)
PM 10	0.094021
PM 2.5	0.082268
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.079154
N ₂ O	0.015443

Pollutant	Emissions Per Year (TONs)
CO ₂	1882.434511
CO ₂ e	1888.743179

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	1.333918
SO _x	0.628763
NO _x	19.391760
CO	1.104743

Pollutant	Emissions Per Year (TONs)
PM 10	0.094021
PM 2.5	0.082268
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.079154
N ₂ O	0.015443

Pollutant	Emissions Per Year (TONs)
CO ₂	1882.434511
CO ₂ e	1888.743179

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	205
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2036, add 19 T-7A Low-Altitude Operations in VR-1141 with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.130904
SO _x	0.061704
NO _x	1.903008
CO	0.108414

Pollutant	Emissions Per Year (TONs)
PM 10	0.009227
PM 2.5	0.008073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.130904
SO _x	0.061704
NO _x	1.903008
CO	0.108414

Pollutant	Emissions Per Year (TONs)
PM 10	0.009227
PM 2.5	0.008073
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 19
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2036, add 25 T-7A Low-Altitude Operations in VR-1142 with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.172242
SO _x	0.081189
NO _x	2.503958
CO	0.142650

Pollutant	Emissions Per Year (TONs)
PM 10	0.012140
PM 2.5	0.010623
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010221
N ₂ O	0.001994

Pollutant	Emissions Per Year (TONs)
CO ₂	243.069019
CO ₂ e	243.883624

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.172242
SO _x	0.081189
NO _x	2.503958
CO	0.142650

Pollutant	Emissions Per Year (TONs)
PM 10	0.012140
PM 2.5	0.010623
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010221
N ₂ O	0.001994

Pollutant	Emissions Per Year (TONs)
CO ₂	243.069019
CO ₂ e	243.883624

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 25
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2036, add 126 T-7A Low-Altitude Operations in VR-1143 with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.988669
SO _x	0.466024
NO _x	14.372716
CO	0.818809

Pollutant	Emissions Per Year (TONs)
PM 10	0.069686
PM 2.5	0.060975
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.058667
N ₂ O	0.011446

Pollutant	Emissions Per Year (TONs)
CO ₂	1395.216167
CO ₂ e	1399.892003

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.988669
SO _x	0.466024
NO _x	14.372716
CO	0.818809

Pollutant	Emissions Per Year (TONs)
PM 10	0.069686
PM 2.5	0.060975
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.058667
N ₂ O	0.011446

Pollutant	Emissions Per Year (TONs)
CO ₂	1395.216167
CO ₂ e	1399.892003

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	126
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

40. Aircraft

40.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, add 41 T-7A Low-Altitude Operations in VR-1146 with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.298170
SO _x	0.140547
NO _x	4.334629
CO	0.246942

Pollutant	Emissions Per Year (TONs)
PM 10	0.021016
PM 2.5	0.018389
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017693
N ₂ O	0.003452

Pollutant	Emissions Per Year (TONs)
CO ₂	420.779479
CO ₂ e	422.189652

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.298170
SO _x	0.140547
NO _x	4.334629
CO	0.246942

Pollutant	Emissions Per Year (TONs)
PM 10	0.021016
PM 2.5	0.018389
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017693
N ₂ O	0.003452

Pollutant	Emissions Per Year (TONs)
CO ₂	420.779479
CO ₂ e	422.189652

40.2 Aircraft & Engines

40.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

40.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

40.3 Flight Operations

40.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 41
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 38
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

40.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

41. Aircraft

41.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2036, add 406 T-7A Low-Altitude Operations in R-5601 Falcon Range with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.025888
SO _x	0.014400
NO _x	0.183911
CO	0.040828

Pollutant	Emissions Per Year (TONs)
PM 10	0.001553
PM 2.5	0.001316
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001813
N ₂ O	0.000354

Pollutant	Emissions Per Year (TONs)
CO ₂	43.112828
CO ₂ e	43.257313

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.025888
SO _x	0.014400
NO _x	0.183911
CO	0.040828

Pollutant	Emissions Per Year (TONs)
PM 10	0.001553
PM 2.5	0.001316
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001813
N ₂ O	0.000354

Pollutant	Emissions Per Year (TONs)
CO ₂	43.112828
CO ₂ e	43.257313

41.2 Aircraft & Engines

41.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

41.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

41.3 Flight Operations

41.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	406
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

41.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

42. Aircraft

42.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2036, remove 15 T-38C Low-Altitude Operations in IR-103 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008325
SO _x	-0.011877
NO _x	-0.021312
CO	-0.343989

Pollutant	Emissions Per Year (TONs)
PM 10	-0.012543
PM 2.5	-0.011211
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008325
SO _x	-0.011877
NO _x	-0.021312
CO	-0.343989

Pollutant	Emissions Per Year (TONs)
PM 10	-0.012543
PM 2.5	-0.011211
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

42.2 Aircraft & Engines

42.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

42.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

42.3 Flight Operations

42.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 15
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

42.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

43. Aircraft

43.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2036, remove 18 T-38C Low-Altitude Operations in VR-158 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.017483
SO _x	-0.024942
NO _x	-0.044755
CO	-0.722377

Pollutant	Emissions Per Year (TONs)
PM 10	-0.026340
PM 2.5	-0.023543
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003140
N ₂ O	-0.000613

Pollutant	Emissions Per Year (TONs)
CO ₂	-74.672186
CO ₂ e	-74.922438

43.2 Aircraft & Engines

43.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

43.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

43.3 Flight Operations

43.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	18
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

43.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

44. Aircraft

44.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2036, remove 229 T-38C Low-Altitude Operations in VR-159 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.216062
SO _x	-0.308248
NO _x	-0.553117
CO	-8.927661

Pollutant	Emissions Per Year (TONs)
PM 10	-0.325533
PM 2.5	-0.290963
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.216062
SO _x	-0.308248
NO _x	-0.553117
CO	-8.927661

Pollutant	Emissions Per Year (TONs)
PM 10	-0.325533
PM 2.5	-0.290963
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

44.2 Aircraft & Engines

44.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

44.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

44.3 Flight Operations

44.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	229
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

44.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

45. Aircraft

45.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2036, remove 22 T-38C Low-Altitude Operations in VR-1141 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.021978
SO _x	-0.031355
NO _x	-0.056264
CO	-0.908131

Pollutant	Emissions Per Year (TONs)
PM 10	-0.033114
PM 2.5	-0.029597
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.021978
SO _x	-0.031355
NO _x	-0.056264
CO	-0.908131

Pollutant	Emissions Per Year (TONs)
PM 10	-0.033114
PM 2.5	-0.029597
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

45.2 Aircraft & Engines

45.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

45.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

45.3 Flight Operations

45.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 22
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

45.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

46. Aircraft

46.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2036, remove 28 T-38C Low-Altitude Operations in VR-1142 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.027972
SO _x	-0.039907
NO _x	-0.071608
CO	-1.155803

Pollutant	Emissions Per Year (TONs)
PM 10	-0.042144
PM 2.5	-0.037669
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.027972
SO _x	-0.039907
NO _x	-0.071608
CO	-1.155803

Pollutant	Emissions Per Year (TONs)
PM 10	-0.042144
PM 2.5	-0.037669
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

46.2 Aircraft & Engines

46.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

46.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

46.3 Flight Operations

46.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	28
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

46.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

47. Aircraft

47.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2036, remove 141 T-38C Low-Altitude Operations in VR-1143 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.160423
SO _x	-0.228870
NO _x	-0.410682
CO	-6.628668

Pollutant	Emissions Per Year (TONs)
PM 10	-0.241704
PM 2.5	-0.216036
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.160423
SO _x	-0.228870
NO _x	-0.410682
CO	-6.628668

Pollutant	Emissions Per Year (TONs)
PM 10	-0.241704
PM 2.5	-0.216036
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

47.2 Aircraft & Engines

47.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

47.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

47.3 Flight Operations

47.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	141
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

47.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

48. Aircraft

48.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, remove 46 T-38C Low-Altitude Operations in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

48.2 Aircraft & Engines

48.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

48.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

48.3 Flight Operations

48.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 46
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

48.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

49. Aircraft

49.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2036, remove 454 T-38C Low-Altitude Operations in R-5601 Falcon Range with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025916
SO _x	-0.005817
NO _x	-0.004098
CO	-0.466707

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011045
PM 2.5	-0.009921
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000732
N ₂ O	-0.000143

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.415982
CO ₂ e	-17.474349

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.025916
SO _x	-0.005817
NO _x	-0.004098
CO	-0.466707

Pollutant	Emissions Per Year (TONs)
PM 10	-0.011045
PM 2.5	-0.009921
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000732
N ₂ O	-0.000143

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.415982
CO ₂ e	-17.474349

49.2 Aircraft & Engines

49.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

49.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

49.3 Flight Operations

49.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	454
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

49.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

50. Aircraft

50.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2037, add 7 T-7A Low-Altitude Operations in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.026793
SO _x	0.012629
NO _x	0.389505
CO	0.022190

Pollutant	Emissions Per Year (TONs)
PM 10	0.001889
PM 2.5	0.001652
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.026793
SO _x	0.012629
NO _x	0.389505
CO	0.022190

Pollutant	Emissions Per Year (TONs)
PM 10	0.001889
PM 2.5	0.001652
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

50.2 Aircraft & Engines

50.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

50.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

50.3 Flight Operations

50.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 7
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

50.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

51. Aircraft

51.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2037, add 8 T-7A Low-Altitude Operations in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.053586
SO _x	0.025259
NO _x	0.779009
CO	0.044380

Pollutant	Emissions Per Year (TONs)
PM 10	0.003777
PM 2.5	0.003305
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003180
N ₂ O	0.000620

Pollutant	Emissions Per Year (TONs)
CO ₂	75.621472
CO ₂ e	75.874905

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.053586
SO _x	0.025259
NO _x	0.779009
CO	0.044380

Pollutant	Emissions Per Year (TONs)
PM 10	0.003777
PM 2.5	0.003305
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003180
N ₂ O	0.000620

Pollutant	Emissions Per Year (TONs)
CO ₂	75.621472
CO ₂ e	75.874905

51.2 Aircraft & Engines

51.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

51.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

51.3 Flight Operations

51.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	8
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

51.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

52. Aircraft

52.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2037, add 107 T-7A Low-Altitude Operations in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.696240
SO _x	0.328184
NO _x	10.121553
CO	0.576622

Pollutant	Emissions Per Year (TONs)
PM 10	0.049074
PM 2.5	0.042940
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.041314
N ₂ O	0.008060

Pollutant	Emissions Per Year (TONs)
CO ₂	982.538989
CO ₂ e	985.831806

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.696240
SO _x	0.328184
NO _x	10.121553
CO	0.576622

Pollutant	Emissions Per Year (TONs)
PM 10	0.049074
PM 2.5	0.042940
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.041314
N ₂ O	0.008060

Pollutant	Emissions Per Year (TONs)
CO ₂	982.538989
CO ₂ e	985.831806

52.2 Aircraft & Engines

52.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

52.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

52.3 Flight Operations

52.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 107
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

52.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

53. Aircraft

53.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2037: Add T-7A MTR Low-Altitude Operations (VR-1141)

- **Activity Description:**

In 2037, add 10 T-7A Low-Altitude Operations in VR-1141 with 131 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2037

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.068897
SO _x	0.032476
NO _x	1.001583
CO	0.057060

Pollutant	Emissions Per Year (TONs)
PM 10	0.004856
PM 2.5	0.004249
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004088
N ₂ O	0.000798

Pollutant	Emissions Per Year (TONs)
CO ₂	97.227607
CO ₂ e	97.553450

- **Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.068897
SO _x	0.032476
NO _x	1.001583
CO	0.057060

Pollutant	Emissions Per Year (TONs)
PM 10	0.004856
PM 2.5	0.004249
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004088
N ₂ O	0.000798

Pollutant	Emissions Per Year (TONs)
CO ₂	97.227607
CO ₂ e	97.553450

53.2 Aircraft & Engines

53.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

53.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

53.3 Flight Operations

53.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	10
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

53.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

54. Aircraft

54.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2037, add 13 T-7A Low-Altitude Operations in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.089566
SO _x	0.042218
NO _x	1.302058
CO	0.074178

Pollutant	Emissions Per Year (TONs)
PM 10	0.006313
PM 2.5	0.005524
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005315
N ₂ O	0.001037

Pollutant	Emissions Per Year (TONs)
CO ₂	126.395890
CO ₂ e	126.819485

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.089566
SO _x	0.042218
NO _x	1.302058
CO	0.074178

Pollutant	Emissions Per Year (TONs)
PM 10	0.006313
PM 2.5	0.005524
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005315
N ₂ O	0.001037

Pollutant	Emissions Per Year (TONs)
CO ₂	126.395890
CO ₂ e	126.819485

54.2 Aircraft & Engines

54.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

54.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

54.3 Flight Operations

54.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 13
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

54.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

55. Aircraft

55.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2037, add 65 T-7A Low-Altitude Operations in VR-1143 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.510027
SO _x	0.240409
NO _x	7.414496
CO	0.422402

Pollutant	Emissions Per Year (TONs)
PM 10	0.035949
PM 2.5	0.031455
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.030265
N ₂ O	0.005905

Pollutant	Emissions Per Year (TONs)
CO ₂	719.754372
CO ₂ e	722.166510

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.510027
SO _x	0.240409
NO _x	7.414496
CO	0.422402

Pollutant	Emissions Per Year (TONs)
PM 10	0.035949
PM 2.5	0.031455
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.030265
N ₂ O	0.005905

Pollutant	Emissions Per Year (TONs)
CO ₂	719.754372
CO ₂ e	722.166510

55.2 Aircraft & Engines

55.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

55.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

55.3 Flight Operations

55.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 65
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

55.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

56. Aircraft

56.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, add 22 T-7A Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
 Start Year: 2037

- Activity End Date

Indefinite: Yes
 End Month: N/A
 End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.159994
SO _x	0.075415
NO _x	2.325898
CO	0.132506

Pollutant	Emissions Per Year (TONs)
PM 10	0.011277
PM 2.5	0.009867
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009494
N ₂ O	0.001852

Pollutant	Emissions Per Year (TONs)
CO ₂	225.784111
CO ₂ e	226.540789

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.159994
SO _x	0.075415
NO _x	2.325898
CO	0.132506

Pollutant	Emissions Per Year (TONs)
PM 10	0.011277
PM 2.5	0.009867
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009494
N ₂ O	0.001852

Pollutant	Emissions Per Year (TONs)
CO ₂	225.784111
CO ₂ e	226.540789

56.2 Aircraft & Engines

56.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

56.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

56.3 Flight Operations

56.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	22
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

56.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

57. Aircraft

57.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2037, add 211 T-7A Low-Altitude Operations in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.013454
SO _x	0.007484
NO _x	0.095580
CO	0.021218

Pollutant	Emissions Per Year (TONs)
PM 10	0.000807
PM 2.5	0.000684
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000942
N ₂ O	0.000184

Pollutant	Emissions Per Year (TONs)
CO ₂	22.405928
CO ₂ e	22.481017

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.013454
SO _x	0.007484
NO _x	0.095580
CO	0.021218

Pollutant	Emissions Per Year (TONs)
PM 10	0.000807
PM 2.5	0.000684
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000942
N ₂ O	0.000184

Pollutant	Emissions Per Year (TONs)
CO ₂	22.405928
CO ₂ e	22.481017

57.2 Aircraft & Engines

57.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

57.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

57.3 Flight Operations

57.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 211
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

57.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

58. Aircraft

58.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-158)

- Activity Description:

In 2037, remove 5 T-38C Low-Altitude Operations in VR-158 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004856
SO _x	-0.006928
NO _x	-0.012432
CO	-0.200660

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007317
PM 2.5	-0.006540
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004856
SO _x	-0.006928
NO _x	-0.012432
CO	-0.200660

Pollutant	Emissions Per Year (TONs)
PM 10	-0.007317
PM 2.5	-0.006540
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

58.2 Aircraft & Engines

58.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

58.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

58.3 Flight Operations

58.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	5
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

58.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

59. Aircraft

59.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-159)

- Activity Description:

In 2037, remove 61 T-38C Low-Altitude Operations in VR-159 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.057554
SO _x	-0.082110
NO _x	-0.147337
CO	-2.378111

Pollutant	Emissions Per Year (TONs)
PM 10	-0.086714
PM 2.5	-0.077505
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.057554
SO _x	-0.082110
NO _x	-0.147337
CO	-2.378111

Pollutant	Emissions Per Year (TONs)
PM 10	-0.086714
PM 2.5	-0.077505
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

59.2 Aircraft & Engines

59.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

59.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

59.3 Flight Operations

59.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: LFP (Low Flight Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 61
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

59.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

60. Aircraft

60.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1141)

- Activity Description:

In 2037, remove 6 T-38C Low-Altitude Operations in VR-1141 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005994
SO _x	-0.008551
NO _x	-0.015345
CO	-0.247672

Pollutant	Emissions Per Year (TONs)
PM 10	-0.009031
PM 2.5	-0.008072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005994
SO _x	-0.008551
NO _x	-0.015345
CO	-0.247672

Pollutant	Emissions Per Year (TONs)
PM 10	-0.009031
PM 2.5	-0.008072
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

60.2 Aircraft & Engines

60.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

60.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

60.3 Flight Operations

60.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	6
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

60.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

61. Aircraft

61.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1142)

- Activity Description:

In 2037, remove 7 T-38C Low-Altitude Operations in VR-1142 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006993
SO _x	-0.009977
NO _x	-0.017902
CO	-0.288951

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010536
PM 2.5	-0.009417
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006993
SO _x	-0.009977
NO _x	-0.017902
CO	-0.288951

Pollutant	Emissions Per Year (TONs)
PM 10	-0.010536
PM 2.5	-0.009417
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

61.2 Aircraft & Engines

61.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

61.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

61.3 Flight Operations

61.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	7
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

61.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

62. Aircraft

62.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1143)

- Activity Description:

In 2037, remove 37 T-38C Low-Altitude Operations in VR-1143 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042097
SO _x	-0.060058
NO _x	-0.107768
CO	-1.739438

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063426
PM 2.5	-0.056690
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.042097
SO _x	-0.060058
NO _x	-0.107768
CO	-1.739438

Pollutant	Emissions Per Year (TONs)
PM 10	-0.063426
PM 2.5	-0.056690
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

62.2 Aircraft & Engines

62.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

62.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

62.3 Flight Operations

62.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 37
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 41
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

62.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

63. Aircraft

63.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, remove 12 T-38C Low-Altitude Operations in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

63.2 Aircraft & Engines

63.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

63.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

63.3 Flight Operations

63.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	12
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

63.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)
 AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
 AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)
 AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)
 AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)
 TD: Test Duration (min)
 60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1,000 pounds
 EF: Emission Factor (lb/1,000 lb fuel)
 NE: Number of Engines
 NA: Number of Aircraft
 NTT: Number of Trim Test
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)
 AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)
 AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
 AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

64. Aircraft

64.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C Range Low-Altitude Operations (R-5601 Falcon Range)

- Activity Description:

In 2037, remove 120 T-38C Low-Altitude Operations in R-5601 Falcon Range with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006850
SO _x	-0.001538

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002919
PM 2.5	-0.002622

Pollutant	Emissions Per Year (TONs)
NO _x	-0.001083
CO	-0.123359

Pollutant	Emissions Per Year (TONs)
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000194
N ₂ O	-0.000038

Pollutant	Emissions Per Year (TONs)
CO ₂	-4.603343
CO ₂ e	-4.618771

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.006850
SO _x	-0.001538
NO _x	-0.001083
CO	-0.123359

Pollutant	Emissions Per Year (TONs)
PM 10	-0.002919
PM 2.5	-0.002622
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000194
N ₂ O	-0.000038

Pollutant	Emissions Per Year (TONs)
CO ₂	-4.603343
CO ₂ e	-4.618771

64.2 Aircraft & Engines

64.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

64.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

64.3 Flight Operations

64.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:
Flight Operation Cycle Type: LFP (Low Flight Pattern)

Number of Annual Flight Operation Cycles for all Aircraft:	120
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

64.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

65. Aircraft

65.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (IR-103)

- Activity Description:

In 2037, remove 4 T-38C Low-Altitude Operations in IR-103 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.002220
SO _x	-0.003167
NO _x	-0.005683
CO	-0.091730

Pollutant	Emissions Per Year (TONs)
PM 10	-0.003345
PM 2.5	-0.002990
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.002220
SO _x	-0.003167
NO _x	-0.005683
CO	-0.091730

Pollutant	Emissions Per Year (TONs)
PM 10	-0.003345
PM 2.5	-0.002990
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

65.2 Aircraft & Engines

65.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

65.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

65.3 Flight Operations

65.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 4
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

65.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

SUA ROI: Alternative 3 GHG Report (Destination Cycles)

AIR CONFORMITY APPLICABILITY MODEL REPORT GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to estimate GHG emissions associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the GHG emissions analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Greer, OK; Harmon, OK; Jackson, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Washita, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3, SUA Destination Cycle

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action's start through the action's "steady state" (SS, net gain/loss in emission stabilized and the action is fully implemented) of emissions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO₂ equivalents (CO₂e). The CO₂e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO₂. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 tons per year (ton/yr) of CO₂e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO₂e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO₂e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected steady state of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e	Threshold	Exceedance
2034	4,748	0.19965167	0.03895209	4,764	68,039	No
2035	18,732	0.78766971	0.15367454	18,795	68,039	No
2036	35,348	1.48635028	0.28998727	35,467	68,039	No
2037	47,391	1.99270747	0.38877767	47,549	68,039	No
2038 [SS Year]	47,391	1.99270747	0.38877767	47,549	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. <https://statesummaries.ncics.org/downloads/>).

State's Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2034	700,652,689	3,554,625	135,896	836,194,567
2035	700,652,689	3,554,625	135,896	836,194,567
2036	700,652,689	3,554,625	135,896	836,194,567
2037	700,652,689	3,554,625	135,896	836,194,567
2038 [SS Year]	700,652,689	3,554,625	135,896	836,194,567

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO ₂	CH ₄	N ₂ O	CO ₂ e
2034	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2035	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2036	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2037	5,136,454,179	25,626,912	1,500,708	6,251,695,230
2038 [SS Year]	5,136,454,179	25,626,912	1,500,708	6,251,695,230

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (i.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact on local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where the action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO ₂	CH ₄	N ₂ O	CO ₂ e
2034-2038	State Total	3,503,263,447	17,773,124	679,479	4,180,972,834
2034-2038	U.S. Total	25,682,270,895	128,134,558	7,503,538	31,258,476,148
2034-2038	Action	153,610	6.459087	1.260169	154,125
Percent of State Totals		0.00438477%	0.00003634%	0.00018546%	0.00368634%
Percent of U.S. Totals		0.00059812%	0.00000504%	0.00001679%	0.00049307%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00006607%.*

* Global value based on the U.S. emitting 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, <https://www.c2es.org/content/international-emissions>).

SUA ROI: Alternative 3 ACAM Detail Report (Destination Cycles)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Beckham, OK; Bryan, OK; Caddo, OK; Carter, OK; Coal, OK; Comanche, OK; Garvin, OK; Grady, OK; Greer, OK; Harmon, OK; Jackson, OK; Jefferson, OK; Johnston, OK; Kiowa, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Roger Mills, OK; Stephens, OK; Tillman, OK; Washita, OK; Archer, TX; Baylor, TX; Bosque, TX; Callahan, TX; Childress, TX; Clay, TX; Collingsworth, TX; Comanche, TX; Cooke, TX; Cottle, TX; Denton, TX; Dickens, TX; Donley, TX; Eastland, TX; Erath, TX; Foard, TX; Gray, TX; Grayson, TX; Hall, TX; Hamilton, TX; Hardeman, TX; Haskell, TX; Hood, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Knox, TX; Montague, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Somervell, TX; Throckmorton, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX; Wise, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX (VR-1146 only)

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3, SUA Destination Cycle

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

The analysis for all construction and operation actions assumes the following: (1) major construction projects, such as those that include new facilities, would occur over a period of 2 years and minor construction projects, such as those that include renovation of existing facilities, would occur over a period of 1 year; (2) during construction, no materials would be required to be hauled on- or off-site as excavated spoils will be used on-site; (3) no new emergency generators, or if any were needed for new facilities, their emissions would be offset by removing generators that were supporting T-38C operations; and (4) T-7A fuel cell maintenance, composite

repair, NDI testing, and fuel storage/dispensing operations/emissions would be equally offset by eliminating those corresponding operations/emissions supporting the T-38C operations. It was assumed all construction would be complete prior to the aircraft transition period (starting in 2034). Surrogate construction years of 2031 and 2032 were used for the construction period. The actual construction period may be different than what was assumed for the analysis.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email:
Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Destination Cycles (IR-103)
3.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-158)
4.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-159)
5.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1141)
6.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1142)
7.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1143)
8.	Aircraft	2034: Add T-7A MTR Destination Cycles (VR-1146)
9.	Aircraft	2034: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
10.	Aircraft	2034: Add T-7A MOA Destination Cycles (Hollis MOA)
11.	Aircraft	2034: Add T-7A MOA Destination Cycles (Westover 1 MOA)
12.	Aircraft	2034: Add T-7A MOA Destination Cycles (Westover 2 MOA)
13.	Aircraft	2034: Add T-7A MOA Destination Cycles (Washita MOA)
14.	Aircraft	2034: Remove T-38C MTR Destination Cycles (IR-103)
15.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-158)
16.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-159)
17.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1141)
18.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1142)
19.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1143)
20.	Aircraft	2034: Remove T-38C MTR Destination Cycles (VR-1146)
21.	Aircraft	2034: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
22.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Hollis MOA)
23.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
24.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
25.	Aircraft	2034: Remove T-38C MOA Destination Cycles (Washita MOA)
26.	Aircraft	2035: Add T-7A MTR Destination Cycles (IR-103)
27.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-158)
28.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-159)
29.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1141)
30.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1142)
31.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1143)
32.	Aircraft	2035: Add T-7A MTR Destination Cycles (VR-1146)
33.	Aircraft	2035: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
34.	Aircraft	2035: Add T-7A MOA Destination Cycles (Hollis MOA)
35.	Aircraft	2035: Add T-7A MOA Destination Cycles (Westover 1 MOA)
36.	Aircraft	2035: Add T-7A MOA Destination Cycles (Westover 2MOA)
37.	Aircraft	2035: Add T-7A MOA Destination Cycles (Washita MOA)
38.	Aircraft	2035: Remove T-38C MTR Destination Cycles (IR-103)
39.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-158)
40.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-159)
41.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1141)
42.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1142)

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AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Activity Type		Activity Title
43.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1143)
44.	Aircraft	2035: Remove T-38C MTR Destination Cycles (VR-1146)
45.	Aircraft	2035: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
46.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Hollis MOA)
47.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
48.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
49.	Aircraft	2035: Remove T-38C MOA Destination Cycles (Washita MOA)
50.	Aircraft	2036: Add T-7A MTR Destination Cycles (IR-103)
51.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-158)
52.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-159)
53.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1141)
54.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1142)
55.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1143)
56.	Aircraft	2036: Add T-7A MTR Destination Cycles (VR-1146)
57.	Aircraft	2036: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
58.	Aircraft	2036: Add T-7A MOA Destination Cycles (Hollis MOA)
59.	Aircraft	2036: Add T-7A MOA Destination Cycles (Westover 1 MOA)
60.	Aircraft	2036: Add T-7A MOA Destination Cycles (Westover 2 MOA)
61.	Aircraft	2036: Add T-7A MOA Destination Cycles (Washita MOA)
62.	Aircraft	2036: Remove T-38C MTR Destination Cycles (IR-103)
63.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-158)
64.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-159)
65.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1141)
66.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1142)
67.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1143)
68.	Aircraft	2036: Remove T-38C MTR Destination Cycles (VR-1146)
69.	Aircraft	2036: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
70.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Hollis MOA)
71.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
72.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
73.	Aircraft	2036: Remove T-38C MOA Destination Cycles (Washita MOA)
74.	Aircraft	2037: Add T-7A MTR Destination Cycles (IR-103)
75.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-158)
76.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-159)
77.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1141)
78.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1142)
79.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1143)
80.	Aircraft	2037: Add T-7A MTR Destination Cycles (VR-1146)
81.	Aircraft	2037: Add T-7A Range Destination Cycles (R-5601 Falcon Range)
82.	Aircraft	2037: Add T-7A MOA Destination Cycles (Hollis MOA)
83.	Aircraft	2037: Add T-7A MOA Destination Cycles (Westover 1 MOA)
84.	Aircraft	2037: Add T-7A MOA Destination Cycles (Westover 2 MOA)
85.	Aircraft	2037: Add T-7A MOA Destination Cycles (Washita MOA)
86.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-158)
87.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-159)
88.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1141)
89.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1142)
90.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1143)
91.	Aircraft	2037: Remove T-38C MTR Destination Cycles (VR-1146)
92.	Aircraft	2037: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)
93.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Hollis MOA)
94.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Westover 1 MOA)
95.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Westover 2 MOA)
96.	Aircraft	2037: Remove T-38C MOA Destination Cycles (Washita MOA)
97.	Aircraft	2037: Remove T-38C MTR Destination Cycles (IR-103)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2034, add 3 T-7A Destination Cycles in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.000681
N ₂ O	0.000133

Pollutant	Emissions Per Year (TONs)
CO ₂	16.204601
CO ₂ e	16.258908

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	3
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2034, add 4 T-7A Destination Cycles in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 4
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MTR Destination Cycles (VR-159)

- **Activity Description:**

In 2034, add 51 T-7A Destination Cycles in VR-159 with 28 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2034

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019692
N ₂ O	0.003842

Pollutant	Emissions Per Year (TONs)
CO ₂	468.312976
CO ₂ e	469.882449

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	51
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2034, add 5 T-7A Destination Cycles in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002044
N ₂ O	0.000399

Pollutant	Emissions Per Year (TONs)
CO ₂	48.613804
CO ₂ e	48.776725

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 5
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2034, add 6 T-7A Destination Cycles in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002453
N ₂ O	0.000479

Pollutant	Emissions Per Year (TONs)
CO ₂	58.336564
CO ₂ e	58.532070

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 6
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2034, add 31 T-7A Destination Cycles in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.014434
N ₂ O	0.002816

Pollutant	Emissions Per Year (TONs)
CO ₂	343.267470
CO ₂ e	344.417874

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28

Flight Operation Cycle Type: DC (Destination Cycle)

Number of Annual Flight Operation Cycles for all Aircraft: 31

Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0

Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins): 0

Takeoff [Military] (mins): 41

Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0

Approach (mins): 0

Intermediate (mins): 0

Military (mins): 0

Afterburn (mins): 0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2034, add 11 T-7A Destination Cycles in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004747
N ₂ O	0.000926

Pollutant	Emissions Per Year (TONs)
CO ₂	112.892055
CO ₂ e	113.270394

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004747
N ₂ O	0.000926

Pollutant	Emissions Per Year (TONs)
CO ₂	112.892055
CO ₂ e	113.270394

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 11
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 38
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2034, add 252 T-7A Destination Cycles in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001125
N ₂ O	0.000220

Pollutant	Emissions Per Year (TONs)
CO ₂	26.759686
CO ₂ e	26.849367

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001125
N ₂ O	0.000220

Pollutant	Emissions Per Year (TONs)
CO ₂	26.759686
CO ₂ e	26.849367

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	252
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2034, add 17 T-7A Destination Cycles in Hollis MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002662
N ₂ O	0.000519

Pollutant	Emissions Per Year (TONs)
CO ₂	63.299814
CO ₂ e	63.511953

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002662
N ₂ O	0.000519

Pollutant	Emissions Per Year (TONs)
CO ₂	63.299814
CO ₂ e	63.511953

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

10.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 17
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2034, add 929 T-7A Destination Cycles in Westover 1 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174543
N ₂ O	0.034053

Pollutant	Emissions Per Year (TONs)
CO ₂	4150.978406
CO ₂ e	4164.889724

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.174543
N ₂ O	0.034053

Pollutant	Emissions Per Year (TONs)
CO ₂	4150.978406
CO ₂ e	4164.889724

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

11.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 929
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 23.4
 Climb Out [Intermediate] (mins): 5.4
 Takeoff [Military] (mins): 7.2
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

11.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2034, add 237 T-7A Destination Cycles in Westover 2 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.046024
N ₂ O	0.008979

Pollutant	Emissions Per Year (TONs)
CO ₂	1094.534097
CO ₂ e	1098.202247

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.046024
N ₂ O	0.008979

Pollutant	Emissions Per Year (TONs)
CO ₂	1094.534097
CO ₂ e	1098.202247

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

12.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	237
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

12.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2034, add 467 T-7A Destination Cycles in Washita MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.085977
N ₂ O	0.016774

Pollutant	Emissions Per Year (TONs)
CO ₂	2044.698023
CO ₂ e	2051.550491

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.085977
N ₂ O	0.016774

Pollutant	Emissions Per Year (TONs)
CO ₂	2044.698023
CO ₂ e	2051.550491

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

13.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 467
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 7.5
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 7.5
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

13.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2034, remove 3 T-38C Destination Cycles in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000299
N ₂ O	-0.000058

Pollutant	Emissions Per Year (TONs)
CO ₂	-7.111637
CO ₂ e	-7.135470

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

14.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	3
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

14.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2034, remove 4 T-38C Destination Cycles in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000698
N ₂ O	-0.000136

Pollutant	Emissions Per Year (TONs)
CO ₂	-16.593819
CO ₂ e	-16.649431

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

15.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 4
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

15.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

16. Aircraft

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2034, remove 45 T-38C Destination Cycles in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007625
N ₂ O	-0.001488

Pollutant	Emissions Per Year (TONs)
CO ₂	-181.346738
CO ₂ e	-181.954492

16.2 Aircraft & Engines

16.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

16.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

16.3 Flight Operations

16.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	45
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

16.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

17. Aircraft

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2034, remove 4 T-38C Destination Cycles in VR-1141 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000718
N ₂ O	-0.000140

Pollutant	Emissions Per Year (TONs)
CO ₂	-17.067928
CO ₂ e	-17.125129

17.2 Aircraft & Engines

17.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

17.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

17.3 Flight Operations

17.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

17.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2034, remove 5 T-38C Destination Cycles in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000897
N ₂ O	-0.000175

Pollutant	Emissions Per Year (TONs)
CO ₂	-21.334910
CO ₂ e	-21.406411

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

18.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 5
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

18.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2034, remove 27 T-38C Destination Cycles in VR-1143 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005517
N ₂ O	-0.001076

Pollutant	Emissions Per Year (TONs)
CO ₂	-131.209699
CO ₂ e	-131.649427

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

19.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

19.3 Flight Operations

19.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	27
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

19.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

20. Aircraft

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2034: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2034, remove 10 T-38C Destination Cycles in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001894
N ₂ O	-0.000369

Pollutant	Emissions Per Year (TONs)
CO ₂	-45.040366
CO ₂ e	-45.191312

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001894
N ₂ O	-0.000369

Pollutant	Emissions Per Year (TONs)
CO ₂	-45.040366
CO ₂ e	-45.191312

20.2 Aircraft & Engines

20.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

20.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

20.3 Flight Operations

20.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	10
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

20.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

21. Aircraft

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2034, remove 220 T-38C Destination Cycles in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000355
N ₂ O	-0.000069

Pollutant	Emissions Per Year (TONs)
CO ₂	-8.439463
CO ₂ e	-8.467746

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000355
N ₂ O	-0.000069

Pollutant	Emissions Per Year (TONs)
CO ₂	-8.439463
CO ₂ e	-8.467746

21.2 Aircraft & Engines

21.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

21.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

21.3 Flight Operations

21.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 220
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

21.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

22. Aircraft

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2034, remove 15 T-38C Destination Cycles in Hollis MOA with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001057
N ₂ O	-0.000206

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.139396
CO ₂ e	-25.223646

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001057
N ₂ O	-0.000206

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.139396
CO ₂ e	-25.223646

22.2 Aircraft & Engines

22.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

22.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

22.3 Flight Operations

22.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

22.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

23. Aircraft

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2034, remove 813 T-38C Destination Cycles in Westover 1 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2034

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.068752
N ₂ O	-0.013414

Pollutant	Emissions Per Year (TONs)
CO ₂	-1635.066305
CO ₂ e	-1640.545959

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.068752
N ₂ O	-0.013414

Pollutant	Emissions Per Year (TONs)
CO ₂	-1635.066305
CO ₂ e	-1640.545959

23.2 Aircraft & Engines

23.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

23.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

23.3 Flight Operations

23.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	813
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

23.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

24. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2034, remove 208 T-38C Destination Cycles in Westover 2 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.018590
N ₂ O	-0.003627

Pollutant	Emissions Per Year (TONs)
CO ₂	-442.107011
CO ₂ e	-443.588659

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.018590
N ₂ O	-0.003627

Pollutant	Emissions Per Year (TONs)
CO ₂	-442.107011
CO ₂ e	-443.588659

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

24.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 208
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

24.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1, 000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2034, remove 409 T-38C Destination Cycles in Washita MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.029490
N ₂ O	-0.005754

Pollutant	Emissions Per Year (TONs)
CO ₂	-701.342867
CO ₂ e	-703.693302

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.029490
N ₂ O	-0.005754

Pollutant	Emissions Per Year (TONs)
CO ₂	-701.342867
CO ₂ e	-703.693302

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

25.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	409
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

25.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2035, add 13 T-7A Destination Cycles in IR-103 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

26.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 13
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

26.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

27. Aircraft

27.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2035, add 17 T-7A Destination Cycles in VR-158 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006757
N ₂ O	0.001318

Pollutant	Emissions Per Year (TONs)
CO ₂	160.695629
CO ₂ e	161.234174

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.006757
N ₂ O	0.001318

Pollutant	Emissions Per Year (TONs)
CO ₂	160.695629
CO ₂ e	161.234174

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	17
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

27.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

28. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2035, add 196 T-7A Destination Cycles in VR-159 with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.075679
N ₂ O	0.014765

Pollutant	Emissions Per Year (TONs)
CO ₂	1799.791044
CO ₂ e	1805.822747

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

28.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

28.3 Flight Operations

28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 196
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

28.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2035: Add T-7A MTR Destination Cycles (VR-1141)

- **Activity Description:**

In 2035, add 19 T-7A Destination Cycles in VR-1141 with 76 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2035

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007768
N ₂ O	0.001515

Pollutant	Emissions Per Year (TONs)
CO ₂	184.732454
CO ₂ e	185.351554

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

29.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

29.3 Flight Operations

29.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	19
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

29.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

30. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2035, add 24 T-7A Destination Cycles in VR-1142 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009812
N ₂ O	0.001914

Pollutant	Emissions Per Year (TONs)
CO ₂	233.346258
CO ₂ e	234.128279

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

30.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

30.3 Flight Operations

30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 24
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

30.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2035, add 120 T-7A Destination Cycles in VR-1143 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.055873
N ₂ O	0.010901

Pollutant	Emissions Per Year (TONs)
CO ₂	1328.777302
CO ₂ e	1333.230479

31.2 Aircraft & Engines

31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

31.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 120
Number of Annual Trim Test(s) per Aircraft: 0

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- **Trim Test**

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

31.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for Flight Operation Cycles per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Flight Operation Cycles per Year**

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for Trim per Year**

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for Trim per Year**

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2035, add 43 T-7A Destination Cycles in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018556
N ₂ O	0.003620

Pollutant	Emissions Per Year (TONs)
CO ₂	441.305307
CO ₂ e	442.784269

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.018556
N ₂ O	0.003620

Pollutant	Emissions Per Year (TONs)
CO ₂	441.305307
CO ₂ e	442.784269

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

32.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	43
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

32.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2035, add 965 T-7A Destination Cycles in R-5601 Falcon Range with 76 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004309
N ₂ O	0.000841

Pollutant	Emissions Per Year (TONs)
CO ₂	102.472608
CO ₂ e	102.816028

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004309
N ₂ O	0.000841

Pollutant	Emissions Per Year (TONs)
CO ₂	102.472608
CO ₂ e	102.816028

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

33.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

33.3 Flight Operations

33.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 965
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

33.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

34. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2035, add 65 T-7A Destination Cycles in Hollis MOA with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010177
N ₂ O	0.001986

Pollutant	Emissions Per Year (TONs)
CO ₂	242.028701
CO ₂ e	242.839821

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010177
N ₂ O	0.001986

Pollutant	Emissions Per Year (TONs)
CO ₂	242.028701
CO ₂ e	242.839821

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

34.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	65
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

34.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2035, add 3,560 T-7A Destination Cycles in Westover 1 MOA with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668861
N ₂ O	0.130495

Pollutant	Emissions Per Year (TONs)
CO ₂	15906.870964
CO ₂ e	15960.180214

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.668861
N ₂ O	0.130495

Pollutant	Emissions Per Year (TONs)
CO ₂	15906.870964
CO ₂ e	15960.180214

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

35.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 3560
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 5.4
Takeoff [Military] (mins): 7.2
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

35.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MOA Destination Cycles (Westover 2MOA)

- Activity Description:

In 2035, add 909 T-7A Destination Cycles in Westover 2 MOA with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.176521
N ₂ O	0.034439

Pollutant	Emissions Per Year (TONs)
CO ₂	4198.023181
CO ₂ e	4212.092162

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.176521
N ₂ O	0.034439

Pollutant	Emissions Per Year (TONs)
CO ₂	4198.023181
CO ₂ e	4212.092162

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

36.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 909
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 23.4
 Climb Out [Intermediate] (mins): 3.6
 Takeoff [Military] (mins): 9
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

36.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

37. Aircraft

37.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add
- Activity Location
 - County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
 - Regulatory Area(s): NOT IN A REGULATORY AREA
- Activity Title: 2035: Add T-7A MOA Destination Cycles (Washita MOA)
- Activity Description:
 - In 2035, add 1,790 T-7A Destination Cycles in Washita MOA with 76 aircraft.
- Activity Start Date
 - Start Month: 1
 - Start Year: 2035
- Activity End Date
 - Indefinite: Yes
 - End Month: N/A
 - End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.329546
N ₂ O	0.064295

Pollutant	Emissions Per Year (TONs)
CO ₂	7837.279361
CO ₂ e	7863.544709

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.329546
N ₂ O	0.064295

Pollutant	Emissions Per Year (TONs)
CO ₂	7837.279361
CO ₂ e	7863.544709

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
 - Aircraft Designation: T-7A
 - Engine Model: F404-GE-102
 - Primary Function: Trainer
 - Aircraft has Afterburn: Yes
 - Number of Engines: 1
- Aircraft & Engine Surrogate
 - Is Aircraft & Engine a Surrogate? No
 - Original Aircraft Name:
 - Original Engine Name:

37.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	76
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,790
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [After brn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

37.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2035, remove 14 T-38C Destination Cycles in IR-103 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001395
N ₂ O	-0.000272

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.187638
CO ₂ e	-33.298861

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

38.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

38.3 Flight Operations

38.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 14
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 20
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

38.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2035, remove 19 T-38C Destination Cycles in VR-158 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003314
N ₂ O	-0.000647

Pollutant	Emissions Per Year (TONs)
CO ₂	-78.820641
CO ₂ e	-79.084796

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003314
N ₂ O	-0.000647

Pollutant	Emissions Per Year (TONs)
CO ₂	-78.820641
CO ₂ e	-79.084796

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

39.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

39.3 Flight Operations

39.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	19
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

39.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

40. Aircraft

40.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2035, remove 224 T-38C Destination Cycles in VR-159 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.037957
N ₂ O	-0.007405

Pollutant	Emissions Per Year (TONs)
CO ₂	-902.703764
CO ₂ e	-905.729027

40.2 Aircraft & Engines

40.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

40.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

40.3 Flight Operations

40.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	224
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

40.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

41. Aircraft

41.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2035, remove 22 T-38C Destination Cycles in VR-1141 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003947
N ₂ O	-0.000770

Pollutant	Emissions Per Year (TONs)
CO ₂	-93.873606
CO ₂ e	-94.188208

41.2 Aircraft & Engines

41.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

41.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

41.3 Flight Operations

41.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 22
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

41.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

42. Aircraft

42.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2035, remove 27 T-38C Destination Cycles in VR-1142 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004844
N ₂ O	-0.000945

Pollutant	Emissions Per Year (TONs)
CO ₂	-115.208516
CO ₂ e	-115.594618

42.2 Aircraft & Engines

42.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

42.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

42.3 Flight Operations

42.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	27
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

42.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

43. Aircraft

43.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2035, remove 137 T-38C Destination Cycles in VR-1143 with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.027995
N ₂ O	-0.005462

Pollutant	Emissions Per Year (TONs)
CO ₂	-665.767732
CO ₂ e	-667.998942

43.2 Aircraft & Engines

43.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

43.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

43.3 Flight Operations

43.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	137
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

43.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

44. Aircraft

44.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2035: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2035, remove 49 T-38C Destination Cycles in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009280
N ₂ O	-0.001811

Pollutant	Emissions Per Year (TONs)
CO ₂	-220.697795
CO ₂ e	-221.437428

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009280
N ₂ O	-0.001811

Pollutant	Emissions Per Year (TONs)
CO ₂	-220.697795
CO ₂ e	-221.437428

44.2 Aircraft & Engines

44.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

44.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

44.3 Flight Operations

44.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 49
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

44.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

45. Aircraft

45.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2035, remove 1,102 T-38C Destination Cycles in R-5601 Falcon Range with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001778
N ₂ O	-0.000347

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.274036
CO ₂ e	-42.415710

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001778
N ₂ O	-0.000347

Pollutant	Emissions Per Year (TONs)
CO ₂	-42.274036
CO ₂ e	-42.415710

45.2 Aircraft & Engines

45.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

45.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

45.3 Flight Operations

45.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,102
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

45.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

46. Aircraft

46.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2035, remove 74 T-38C Destination Cycles in Hollis MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005215
N ₂ O	-0.001017

Pollutant	Emissions Per Year (TONs)
CO ₂	-124.021019
CO ₂ e	-124.436655

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005215
N ₂ O	-0.001017

Pollutant	Emissions Per Year (TONs)
CO ₂	-124.021019
CO ₂ e	-124.436655

46.2 Aircraft & Engines

46.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

46.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

46.3 Flight Operations

46.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	74
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

46.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

47. Aircraft

47.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2035, remove 4,063 T-38C Destination Cycles in Westover 1 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.343592
N ₂ O	-0.067035

Pollutant	Emissions Per Year (TONs)
CO ₂	-8171.309221
CO ₂ e	-8198.694014

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.343592
N ₂ O	-0.067035

Pollutant	Emissions Per Year (TONs)
CO ₂	-8171.309221
CO ₂ e	-8198.694014

47.2 Aircraft & Engines

47.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

47.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

47.3 Flight Operations

47.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 4,063
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 5.4
Takeoff [Military] (mins): 7.2
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

47.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

48. Aircraft

48.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2035, remove 1,477 T-38C Destination Cycles in Westover 2 MOA with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.132007
N ₂ O	-0.025755

Pollutant	Emissions Per Year (TONs)
CO ₂	-3139.384879
CO ₂ e	-3149.906009

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.132007
N ₂ O	-0.025755

Pollutant	Emissions Per Year (TONs)
CO ₂	-3139.384879
CO ₂ e	-3149.906009

48.2 Aircraft & Engines

48.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

48.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

48.3 Flight Operations

48.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1477
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

48.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

49. Aircraft

49.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2035, remove 2,043 T-38C Destination Cycles in Washita MOA with 28 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2035

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.147308
N ₂ O	-0.028740

Pollutant	Emissions Per Year (TONs)
CO ₂	-3503.284787
CO ₂ e	-3515.025467

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.147308
N ₂ O	-0.028740

Pollutant	Emissions Per Year (TONs)
CO ₂	-3503.284787
CO ₂ e	-3515.025467

49.2 Aircraft & Engines

49.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

49.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

49.3 Flight Operations

49.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 2,043
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

49.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

50. Aircraft

50.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2036, add 13 T-7A Destination Cycles in IR-103 with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002953
N ₂ O	0.000576

Pollutant	Emissions Per Year (TONs)
CO ₂	70.219939
CO ₂ e	70.455269

50.2 Aircraft & Engines

50.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

50.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

50.3 Flight Operations

50.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	13
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

50.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

51. Aircraft

51.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2036, add 18 T-7A Destination Cycles in VR-158 with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007154
N ₂ O	0.001396

Pollutant	Emissions Per Year (TONs)
CO ₂	170.148313
CO ₂ e	170.718537

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.007154
N ₂ O	0.001396

Pollutant	Emissions Per Year (TONs)
CO ₂	170.148313
CO ₂ e	170.718537

51.2 Aircraft & Engines

51.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

51.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

51.3 Flight Operations

51.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 18
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 35
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

51.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

52. Aircraft

52.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Destination Cycles (VR-159)

- **Activity Description:**

In 2036, add 205 T-7A Destination Cycles in VR-159 with 124 aircraft.

- **Activity Start Date**

Start Month: 1

Start Year: 2036

- **Activity End Date**

Indefinite: Yes

End Month: N/A

End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.079154
N ₂ O	0.015443

Pollutant	Emissions Per Year (TONs)
CO ₂	1882.434511
CO ₂ e	1888.743179

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.079154
N ₂ O	0.015443

Pollutant	Emissions Per Year (TONs)
CO ₂	1882.434511
CO ₂ e	1888.743179

52.2 Aircraft & Engines

52.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

52.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

52.3 Flight Operations

52.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	205
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

52.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

53. Aircraft

53.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1141)

- Activity Description:

In 2036, add 20 T-7A Destination Cycles in VR-1141 with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008177
N ₂ O	0.001595

Pollutant	Emissions Per Year (TONs)
CO ₂	194.455215
CO ₂ e	195.106899

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.008177
N ₂ O	0.001595

Pollutant	Emissions Per Year (TONs)
CO ₂	194.455215
CO ₂ e	195.106899

53.2 Aircraft & Engines

53.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

53.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

53.3 Flight Operations

53.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 20
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

53.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)
AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)
AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)
AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)
AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

54. Aircraft

54.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2036, add 25 T-7A Destination Cycles in VR-1142 with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010221
N ₂ O	0.001994

Pollutant	Emissions Per Year (TONs)
CO ₂	243.069019
CO ₂ e	243.883624

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010221
N ₂ O	0.001994

Pollutant	Emissions Per Year (TONs)
CO ₂	243.069019
CO ₂ e	243.883624

54.2 Aircraft & Engines

54.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

54.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

54.3 Flight Operations

54.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 25
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 36
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

54.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

55. Aircraft

55.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2036, add 126 T-7A Destination Cycles in VR-1143 with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.058667
N ₂ O	0.011446

Pollutant	Emissions Per Year (TONs)
CO ₂	1395.216167
CO ₂ e	1399.892003

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.058667
N ₂ O	0.011446

Pollutant	Emissions Per Year (TONs)
CO ₂	1395.216167
CO ₂ e	1399.892003

55.2 Aircraft & Engines

55.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A

Engine Model: F404-GE-102

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

55.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

55.3 Flight Operations

55.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	126
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

55.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

56. Aircraft

56.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2036, add 45 T-7A Destination Cycles in VR-1146 with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019419
N ₂ O	0.003789

Pollutant	Emissions Per Year (TONs)
CO ₂	461.831135
CO ₂ e	463.378886

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019419
N ₂ O	0.003789

Pollutant	Emissions Per Year (TONs)
CO ₂	461.831135
CO ₂ e	463.378886

56.2 Aircraft & Engines

56.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

56.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

56.3 Flight Operations

56.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 45
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

56.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

57. Aircraft

57.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2036, add 1,007 T-7A Destination Cycles in R-5601 Falcon Range with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004496
N ₂ O	0.000877

Pollutant	Emissions Per Year (TONs)
CO ₂	106.932555
CO ₂ e	107.290922

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004496
N ₂ O	0.000877

Pollutant	Emissions Per Year (TONs)
CO ₂	106.932555
CO ₂ e	107.290922

57.2 Aircraft & Engines

57.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

57.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

57.3 Flight Operations

57.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,007
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0.4
Climb Out [Intermediate] (mins):	0.43
Takeoff [Military] (mins):	0
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

57.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

58. Aircraft

58.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2036, add 67 T-7A Destination Cycles in Hollis MOA with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010490
N ₂ O	0.002047

Pollutant	Emissions Per Year (TONs)
CO ₂	249.475738
CO ₂ e	250.311815

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.010490
N ₂ O	0.002047

Pollutant	Emissions Per Year (TONs)
CO ₂	249.475738
CO ₂ e	250.311815

58.2 Aircraft & Engines

58.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

58.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

58.3 Flight Operations

58.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 67
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 19.5
Climb Out [Intermediate] (mins): 4.5
Takeoff [Military] (mins): 6
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

58.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

59. Aircraft

59.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2036, add 3,714 T-7A Destination Cycles in Westover 1 MOA with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.697795
N ₂ O	0.136140

Pollutant	Emissions Per Year (TONs)
CO ₂	16594.977179
CO ₂ e	16650.592504

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.697795
N ₂ O	0.136140

Pollutant	Emissions Per Year (TONs)
CO ₂	16594.977179
CO ₂ e	16650.592504

59.2 Aircraft & Engines

59.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

59.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

59.3 Flight Operations

59.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 3,714
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

59.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

60. Aircraft

60.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2036, add 949 T-7A Destination Cycles in Westover 2 MOA with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.184288
N ₂ O	0.035955

Pollutant	Emissions Per Year (TONs)
CO ₂	4382.754674
CO ₂ e	4397.442752

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.184288
N ₂ O	0.035955

Pollutant	Emissions Per Year (TONs)
CO ₂	4382.754674
CO ₂ e	4397.442752

60.2 Aircraft & Engines

60.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

60.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

60.3 Flight Operations

60.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	124
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	949
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	3.6
Takeoff [Military] (mins):	9
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

60.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

61. Aircraft

61.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2036, add 1,868 T-7A Destination Cycles in Washita MOA with 124 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gases:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.343906
N ₂ O	0.067096

Pollutant	Emissions Per Year (TONs)
CO ₂	8178.792093
CO ₂ e	8206.201964

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.343906
N ₂ O	0.067096

Pollutant	Emissions Per Year (TONs)
CO ₂	8178.792093
CO ₂ e	8206.201964

61.2 Aircraft & Engines

61.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

61.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1, 000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

61.3 Flight Operations

61.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1868
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 7.5
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 7.5
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

61.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

62. Aircraft

62.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2036, remove 15 T-38C Destination Cycles in IR-103 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001495
N ₂ O	-0.000292

Pollutant	Emissions Per Year (TONs)
CO ₂	-35.558184
CO ₂ e	-35.677351

62.2 Aircraft & Engines

62.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

62.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH₄	N₂O	CO₂	CO₂e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

62.3 Flight Operations

62.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

62.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

63. Aircraft

63.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2036, remove 20 T-38C Destination Cycles in VR-158 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003489
N ₂ O	-0.000681

Pollutant	Emissions Per Year (TONs)
CO ₂	-82.969096
CO ₂ e	-83.247153

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.003489
N ₂ O	-0.000681

Pollutant	Emissions Per Year (TONs)
CO ₂	-82.969096
CO ₂ e	-83.247153

63.2 Aircraft & Engines

63.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

63.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

63.3 Flight Operations

63.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 20
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

63.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

64. Aircraft

64.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2036, remove 229 T-38C Destination Cycles in VR-159 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.038805
N ₂ O	-0.007571

Pollutant	Emissions Per Year (TONs)
CO ₂	-922.853402
CO ₂ e	-925.946193

64.2 Aircraft & Engines

64.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

64.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

64.3 Flight Operations

64.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	229
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

64.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

65. Aircraft

65.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2036, remove 23 T-38C Destination Cycles in VR-1141 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004127
N ₂ O	-0.000805

Pollutant	Emissions Per Year (TONs)
CO ₂	-98.140588
CO ₂ e	-98.469490

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.004127
N ₂ O	-0.000805

Pollutant	Emissions Per Year (TONs)
CO ₂	-98.140588
CO ₂ e	-98.469490

65.2 Aircraft & Engines

65.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

65.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

65.3 Flight Operations

65.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	23
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

65.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

66. Aircraft

66.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2036, remove 28 T-38C Destination Cycles in VR-1142 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005024
N ₂ O	-0.000980

Pollutant	Emissions Per Year (TONs)
CO ₂	-119.475498
CO ₂ e	-119.875901

66.2 Aircraft & Engines

66.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

66.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

66.3 Flight Operations

66.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 28
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

66.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

67. Aircraft

67.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2036, remove 141 T-38C Destination Cycles in VR-1143 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.028812
N ₂ O	-0.005621

Pollutant	Emissions Per Year (TONs)
CO ₂	-685.206206
CO ₂ e	-687.502561

67.2 Aircraft & Engines

67.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

67.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

67.3 Flight Operations

67.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	141
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

67.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

68. Aircraft

68.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2036: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2036, remove 50 T-38C Destination Cycles in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009469
N ₂ O	-0.001847

Pollutant	Emissions Per Year (TONs)
CO ₂	-225.201832
CO ₂ e	-225.956559

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.009469
N ₂ O	-0.001847

Pollutant	Emissions Per Year (TONs)
CO ₂	-225.201832
CO ₂ e	-225.956559

68.2 Aircraft & Engines

68.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

68.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

68.3 Flight Operations

68.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	50
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

68.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

69. Aircraft

69.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2036, remove 1,128 T-38C Destination Cycles in R-5601 Falcon Range with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001820
N ₂ O	-0.000355

Pollutant	Emissions Per Year (TONs)
CO ₂	-43.271427
CO ₂ e	-43.416444

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001820
N ₂ O	-0.000355

Pollutant	Emissions Per Year (TONs)
CO ₂	-43.271427
CO ₂ e	-43.416444

69.2 Aircraft & Engines

69.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

69.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

69.3 Flight Operations

69.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,128
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

69.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

70. Aircraft

70.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2036, remove 75 T-38C Destination Cycles in Hollis MOA with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005285
N ₂ O	-0.001031

Pollutant	Emissions Per Year (TONs)
CO ₂	-125.696979
CO ₂ e	-126.118232

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.005285
N ₂ O	-0.001031

Pollutant	Emissions Per Year (TONs)
CO ₂	-125.696979
CO ₂ e	-126.118232

70.2 Aircraft & Engines

70.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

70.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

70.3 Flight Operations

70.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	75
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

70.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000,pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

71. Aircraft

71.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2036, remove 4,159 T-38C Destination Cycles in Westover 1 MOA with 56 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2036

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.351710
N ₂ O	-0.068619

Pollutant	Emissions Per Year (TONs)
CO ₂	-8364.379781
CO ₂ e	-8392.411618

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.351710
N ₂ O	-0.068619

Pollutant	Emissions Per Year (TONs)
CO ₂	-8364.379781
CO ₂ e	-8392.411618

71.2 Aircraft & Engines

71.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

71.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

71.3 Flight Operations

71.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4,159
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

71.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

72. Aircraft

72.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2036, remove 623 T-38C Destination Cycles in Westover 2 MOA with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.055680
N ₂ O	-0.010863

Pollutant	Emissions Per Year (TONs)
CO ₂	-1324.195518
CO ₂ e	-1328.633340

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.055680
N ₂ O	-0.010863

Pollutant	Emissions Per Year (TONs)
CO ₂	-1324.195518
CO ₂ e	-1328.633340

72.2 Aircraft & Engines

72.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

72.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

72.3 Flight Operations

72.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 56
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 623
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

72.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

73. Aircraft

73.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2036, remove 2,092 T-38C Destination Cycles in Washita MOA with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.150841
N ₂ O	-0.029429

Pollutant	Emissions Per Year (TONs)
CO ₂	-3587.308749
CO ₂ e	-3599.331022

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.150841
N ₂ O	-0.029429

Pollutant	Emissions Per Year (TONs)
CO ₂	-3587.308749
CO ₂ e	-3599.331022

73.2 Aircraft & Engines

73.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

73.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

73.3 Flight Operations

73.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	2,092
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

73.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

74. Aircraft

74.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (IR-103)

- Activity Description:

In 2037, add 7 T-7A Destination Cycles in IR-103 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.001590
N ₂ O	0.000310

Pollutant	Emissions Per Year (TONs)
CO ₂	37.810736
CO ₂ e	37.937453

74.2 Aircraft & Engines

74.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

74.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

74.3 Flight Operations

74.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 7
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 20
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

74.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

75. Aircraft

75.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-158)

- Activity Description:

In 2037, add 9 T-7A Destination Cycles in VR-158 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003577
N ₂ O	0.000698

Pollutant	Emissions Per Year (TONs)
CO ₂	85.074157
CO ₂ e	85.359268

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003577
N ₂ O	0.000698

Pollutant	Emissions Per Year (TONs)
CO ₂	85.074157
CO ₂ e	85.359268

75.2 Aircraft & Engines

75.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

75.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

75.3 Flight Operations

75.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	9
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	35
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

75.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

76. Aircraft

76.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-159)

- Activity Description:

In 2037, add 107 T-7A Destination Cycles in VR-159 with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.041314
N ₂ O	0.008060

Pollutant	Emissions Per Year (TONs)
CO ₂	982.538989
CO ₂ e	985.831806

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.041314
N ₂ O	0.008060

Pollutant	Emissions Per Year (TONs)
CO ₂	982.538989
CO ₂ e	985.831806

76.2 Aircraft & Engines

76.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

76.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

76.3 Flight Operations

76.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 107
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 34
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

76.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

77. Aircraft

77.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2037: Add T-7A MTR Destination Cycles (VR-1141)

- **Activity Description:**

In 2037, add 10 T-7A Destination Cycles in VR-1141 with 131 aircraft.

- **Activity Start Date**

Start Month: 1
Start Year: 2037

- **Activity End Date**

Indefinite: Yes
End Month: N/A
End Year: N/A

- **Activity Emissions of Criteria Pollutants:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004088
N ₂ O	0.000798

Pollutant	Emissions Per Year (TONs)
CO ₂	97.227607
CO ₂ e	97.553450

- **Activity Emissions of Criteria Pollutants [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- **Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:**

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004088
N ₂ O	0.000798

Pollutant	Emissions Per Year (TONs)
CO ₂	97.227607
CO ₂ e	97.553450

77.2 Aircraft & Engines

77.2.1 Aircraft & Engines Assumptions

- **Aircraft & Engine**

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- **Aircraft & Engine Surrogate**

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

77.2.2 Aircraft & Engines Emission Factor(s)

- **Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)**

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

77.3 Flight Operations

77.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	10
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

77.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

78. Aircraft

78.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1142)

- Activity Description:

In 2037, add 13 T-7A Destination Cycles in VR-1142 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005315
N ₂ O	0.001037

Pollutant	Emissions Per Year (TONs)
CO ₂	126.395890
CO ₂ e	126.819485

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005315
N ₂ O	0.001037

Pollutant	Emissions Per Year (TONs)
CO ₂	126.395890
CO ₂ e	126.819485

78.2 Aircraft & Engines

78.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

78.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

78.3 Flight Operations

78.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 13
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

78.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

79. Aircraft

79.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** 2037: Add T-7A MTR Destination Cycles (VR-1143)

- Activity Description:

In 2037, add 65 T-7A Destination Cycles in VR-1143 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.030265
N ₂ O	0.005905

Pollutant	Emissions Per Year (TONs)
CO ₂	719.754372
CO ₂ e	722.166510

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.030265
N ₂ O	0.005905

Pollutant	Emissions Per Year (TONs)
CO ₂	719.754372
CO ₂ e	722.166510

79.2 Aircraft & Engines

79.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

79.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

79.3 Flight Operations

79.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 65
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

79.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

80. Aircraft

80.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Add T-7A MTR Destination Cycles (VR-1146)

- Activity Description:

In 2037, add 23 T-7A Destination Cycles in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009925
N ₂ O	0.001936

Pollutant	Emissions Per Year (TONs)
CO ₂	236.047025
CO ₂ e	236.838097

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009925
N ₂ O	0.001936

Pollutant	Emissions Per Year (TONs)
CO ₂	236.047025
CO ₂ e	236.838097

80.2 Aircraft & Engines

80.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

80.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

80.3 Flight Operations

80.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	23
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

80.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

81. Aircraft

81.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2037, add 525 T-7A Destination Cycles in R-5601 Falcon Range with 131 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002344
N ₂ O	0.000457

Pollutant	Emissions Per Year (TONs)
CO ₂	55.749346
CO ₂ e	55.936181

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002344
N ₂ O	0.000457

Pollutant	Emissions Per Year (TONs)
CO ₂	55.749346
CO ₂ e	55.936181

81.2 Aircraft & Engines

81.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
 Engine Model: F404-GE-102
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

81.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

81.3 Flight Operations

81.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 525
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0.4
 Climb Out [Intermediate] (mins): 0.43
 Takeoff [Military] (mins): 0
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
 Approach (mins): 0
 Intermediate (mins): 0
 Military (mins): 0
 Afterburn (mins): 0

81.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

82. Aircraft

82.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2037, add 35 T-7A Destination Cycles in Hollis MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005480
N ₂ O	0.001069

Pollutant	Emissions Per Year (TONs)
CO ₂	130.323147
CO ₂ e	130.759903

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005480
N ₂ O	0.001069

Pollutant	Emissions Per Year (TONs)
CO ₂	130.323147
CO ₂ e	130.759903

82.2 Aircraft & Engines

82.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

82.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

82.3 Flight Operations

82.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	35
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

82.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

83. Aircraft

83.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2037, add 1,935 T-7A Destination Cycles in Westover 1 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.363552
N ₂ O	0.070929

Pollutant	Emissions Per Year (TONs)
CO ₂	8646.009920
CO ₂ e	8674.985594

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.363552
N ₂ O	0.070929

Pollutant	Emissions Per Year (TONs)
CO ₂	8646.009920
CO ₂ e	8674.985594

83.2 Aircraft & Engines

83.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

83.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

83.3 Flight Operations

83.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 1,935
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 5.4
Takeoff [Military] (mins): 7.2
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

83.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

84. Aircraft

84.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2037, add 494 T-7A Destination Cycles in Westover 2 MOA with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.095931
N ₂ O	0.018716

Pollutant	Emissions Per Year (TONs)
CO ₂	2281.433940
CO ₂ e	2289.079789

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.095931
N ₂ O	0.018716

Pollutant	Emissions Per Year (TONs)
CO ₂	2281.433940
CO ₂ e	2289.079789

84.2 Aircraft & Engines

84.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

84.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

84.3 Flight Operations

84.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 494
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

84.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

85. Aircraft

85.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add
- Activity Location
 - County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
 - Regulatory Area(s): NOT IN A REGULATORY AREA
- Activity Title: 2037: Add T-7A MOA Destination Cycles (Washita MOA)
- Activity Description:
 - In 2037, add 973 T-7A Destination Cycles in Washita MOA with 131 aircraft.
- Activity Start Date
 - Start Month: 1
 - Start Year: 2037
- Activity End Date
 - Indefinite: Yes
 - End Month: N/A
 - End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.179133
N ₂ O	0.034949

Pollutant	Emissions Per Year (TONs)
CO ₂	4260.152413
CO ₂ e	4274.429610

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.179133
N ₂ O	0.034949

Pollutant	Emissions Per Year (TONs)
CO ₂	4260.152413
CO ₂ e	4274.429610

85.2 Aircraft & Engines

85.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
 - Aircraft Designation: T-7A
 - Engine Model: F404-GE-102
 - Primary Function: Trainer
 - Aircraft has Afterburn: Yes
 - Number of Engines: 1
- Aircraft & Engine Surrogate
 - Is Aircraft & Engine a Surrogate? No
 - Original Aircraft Name:
 - Original Engine Name:

85.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

85.3 Flight Operations

85.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	973
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

85.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

86. Aircraft

86.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Bosque, TX; Clay, TX; Comanche, TX; Eastland, TX; Erath, TX; Hamilton, TX; Hood, TX; Jack, TX; Palo Pinto, TX; Somervell, TX; Stephens, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-158)

- Activity Description:

In 2037, remove 5 T-38C Destination Cycles in VR-158 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000872
N ₂ O	-0.000170

Pollutant	Emissions Per Year (TONs)
CO ₂	-20.742274
CO ₂ e	-20.811788

86.2 Aircraft & Engines

86.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

86.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

86.3 Flight Operations

86.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
 Flight Operation Cycle Type: DC (Destination Cycle)
 Number of Annual Flight Operation Cycles for all Aircraft: 5
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
 Approach [Approach] (mins): 0
 Climb Out [Intermediate] (mins): 0
 Takeoff [Military] (mins): 35
 Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

86.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

87. Aircraft

87.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Cottle, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-159)

- Activity Description:

In 2037, remove 61 T-38C Destination Cycles in VR-159 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010337
N ₂ O	-0.002017

Pollutant	Emissions Per Year (TONs)
CO ₂	-245.825579
CO ₂ e	-246.649423

87.2 Aircraft & Engines

87.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

87.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

87.3 Flight Operations

87.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	61
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	34
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

87.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

88. Aircraft

88.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1141)

- Activity Description:

In 2037, remove 6 T-38C Destination Cycles in VR-1141 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001077
N ₂ O	-0.000210

Pollutant	Emissions Per Year (TONs)
CO ₂	-25.601892
CO ₂ e	-25.687693

88.2 Aircraft & Engines

88.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

88.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

88.3 Flight Operations

88.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	6
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	36
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

88.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

89. Aircraft

89.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Roger Mills, OK; Baylor, TX; Collingsworth, TX; Cottle, TX; Donley, TX; Foard, TX; Gray, TX; Hall, TX; Hardeman, TX; King, TX; Knox, TX; Motley, TX; Wheeler, TX; Wichita, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1142)

- Activity Description:

In 2037, remove 7 T-38C Destination Cycles in VR-1142 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001256
N ₂ O	-0.000245

Pollutant	Emissions Per Year (TONs)
CO ₂	-29.868875
CO ₂ e	-29.968975

89.2 Aircraft & Engines

89.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

89.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

89.3 Flight Operations

89.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 7
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 36
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

89.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

90. Aircraft

90.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Callahan, TX; Childress, TX; Cottle, TX; Dickens, TX; Eastland, TX; Foard, TX; Hardeman, TX; Haskell, TX; Jack, TX; Jones, TX; Kent, TX; King, TX; Motley, TX; Palo Pinto, TX; Shackelford, TX; Stephens, TX; Stonewall, TX; Throckmorton, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1143)

- Activity Description:

In 2037, remove 37 T-38C Destination Cycles in VR-1143 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.007561
N ₂ O	-0.001475

Pollutant	Emissions Per Year (TONs)
CO ₂	-179.805884
CO ₂ e	-180.408473

90.2 Aircraft & Engines

90.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

90.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

90.3 Flight Operations

90.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	37
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	41
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

90.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

91. Aircraft

91.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): NOT IN A REGULATORY AREA; Dallas-Fort Worth, TX

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (VR-1146)

- Activity Description:

In 2037, remove 13 T-38C Destination Cycles in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002462
N ₂ O	-0.000480

Pollutant	Emissions Per Year (TONs)
CO ₂	-58.552476
CO ₂ e	-58.748705

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002462
N ₂ O	-0.000480

Pollutant	Emissions Per Year (TONs)
CO ₂	-58.552476
CO ₂ e	-58.748705

91.2 Aircraft & Engines

91.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

91.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

91.3 Flight Operations

91.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	13
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

91.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

92. Aircraft

92.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Kiowa, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C Range Destination Cycles (R-5601 Falcon Range)

- Activity Description:

In 2037, remove 299 T-38C Destination Cycles in R-5601 Falcon Range with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000482
N ₂ O	-0.000094

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.469997
CO ₂ e	-11.508437

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000482
N ₂ O	-0.000094

Pollutant	Emissions Per Year (TONs)
CO ₂	-11.469997
CO ₂ e	-11.508437

92.2 Aircraft & Engines

92.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

92.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

92.3 Flight Operations

92.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 299
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0.4
Climb Out [Intermediate] (mins): 0.43
Takeoff [Military] (mins): 0
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

92.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

93. Aircraft

93.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Beckham, OK; Greer, OK; Harmon, OK; Jackson, OK; Childress, TX; Collingsworth, TX; Hardeman, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Hollis MOA)

- Activity Description:

In 2037, remove 20 T-38C Destination Cycles in Hollis MOA with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001409
N ₂ O	-0.000275

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.519194
CO ₂ e	-33.631528

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001409
N ₂ O	-0.000275

Pollutant	Emissions Per Year (TONs)
CO ₂	-33.519194
CO ₂ e	-33.631528

93.2 Aircraft & Engines

93.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C

Engine Model: J85-GE-5R

Primary Function: Trainer

Aircraft has Afterburn: Yes

Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

93.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

93.3 Flight Operations

93.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	20
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	19.5
Climb Out [Intermediate] (mins):	4.5
Takeoff [Military] (mins):	6
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

93.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

94. Aircraft

94.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Archer, TX; Baylor, TX; Foard, TX; Hardeman, TX; Haskell, TX; Knox, TX; Throckmorton, TX; Wilbarger, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Westover 1 MOA)

- Activity Description:

In 2037, remove 1,103 T-38C Destination Cycles in Westover 1 MOA with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.093276
N ₂ O	-0.018198

Pollutant	Emissions Per Year (TONs)
CO ₂	-2218.300288
CO ₂ e	-2225.734555

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.093276
N ₂ O	-0.018198

Pollutant	Emissions Per Year (TONs)
CO ₂	-2218.300288
CO ₂ e	-2225.734555

94.2 Aircraft & Engines

94.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

94.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

94.3 Flight Operations

94.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	1,103
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	23.4
Climb Out [Intermediate] (mins):	5.4
Takeoff [Military] (mins):	7.2
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

94.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

95. Aircraft

95.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Childress, TX; Cottle, TX; Dickens, TX; Foard, TX; Hall, TX; Hardeman, TX; Haskell, TX; Jones, TX; King, TX; Knox, TX; Motley, TX; Shackelford, TX; Stonewall, TX; Throckmorton, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Westover 2 MOA)

- Activity Description:

In 2037, remove 282 T-38C Destination Cycles in Westover 2 MOA with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.025204
N ₂ O	-0.004917

Pollutant	Emissions Per Year (TONs)
CO ₂	-599.395082
CO ₂ e	-601.403855

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.025204
N ₂ O	-0.004917

Pollutant	Emissions Per Year (TONs)
CO ₂	-599.395082
CO ₂ e	-601.403855

95.2 Aircraft & Engines

95.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

95.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

95.3 Flight Operations

95.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 47
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 282
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 23.4
Climb Out [Intermediate] (mins): 3.6
Takeoff [Military] (mins): 9
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

95.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)

AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)

AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)

AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)

AEPS_{AFTERBURN}: Aircraft Emissions for Afterburner Power Setting (TONs)

96. Aircraft

96.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Caddo, OK; Comanche, OK; Grady, OK; Kiowa, OK; Washita, OK
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MOA Destination Cycles (Washita MOA)

- Activity Description:

In 2037, remove 555 T-38C Destination Cycles in Washita MOA with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.040018
N ₂ O	-0.007807

Pollutant	Emissions Per Year (TONs)
CO ₂	-951.699979
CO ₂ e	-954.889444

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.040018
N ₂ O	-0.007807

Pollutant	Emissions Per Year (TONs)
CO ₂	-951.699979
CO ₂ e	-954.889444

96.2 Aircraft & Engines

96.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

96.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

96.3 Flight Operations

96.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	555
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	7.5
Climb Out [Intermediate] (mins):	10
Takeoff [Military] (mins):	7.5
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

96.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)

AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

NA: Number of Aircraft

NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)

$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

97. Aircraft

97.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Kiowa, OK; Tillman, OK; Archer, TX; Baylor, TX; Clay, TX; Jack, TX; Wichita, TX; Wilbarger, TX; Young, TX

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Destination Cycles (IR-103)

- Activity Description:

In 2037, remove 4 T-38C Destination Cycles in IR-103 with 47 aircraft.

- Activity Start Date

Start Month: 1

Start Year: 2037

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.000399
N ₂ O	-0.000078

Pollutant	Emissions Per Year (TONs)
CO ₂	-9.482182
CO ₂ e	-9.513960

97.2 Aircraft & Engines

97.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

97.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

97.3 Flight Operations

97.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft:	4
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	20
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

97.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

SUA ROI: VR-1146 Low Flight Patterns Only

VR-1146: Alternative 1 ACAM Report (Low Flight Patterns)

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF CONFORMITY ANALYSIS (ROCA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State: Texas, Oklahoma

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1, VR-1146 Low Flight Pattern

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Analysis: Total reasonably foreseeable net change in direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" (highest annual emissions) and "steady state" (no net gain/loss in emission stabilized and the action is fully implemented) emissions. General Conformity

under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

All emissions estimates were derived from various sources using the methods, algorithms, and emission factors from the most current *Air Emissions Guide for Air Force Stationary Sources*, *Air Emissions Guide for Air Force Mobile Sources*, and/or *Air Emissions Guide for Air Force Transitory Sources*. For greater details of this analysis, refer to the Detail ACAM Report.

____ applicable
 X not applicable

Conformity Analysis Summary:

2034

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.063	25	No
NOx	1.033	25	No
CO	-0.332		
SOx	0.021		
PM 10	-0.009		
PM 2.5	-0.008		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.063	25	No
NOx	1.033	25	No
CO	-0.332		
SOx	0.021		
PM 10	-0.009		
PM 2.5	-0.008		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.063		
NOx	1.033		
CO	-0.332		
SOx	0.021		
PM 10	-0.009		
PM 2.5	-0.008		
Pb	0.000		
NH3	0.000		

2035

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.307	25	No
NOx	5.140	25	No
CO	-2.052		
SOx	0.090		
PM 10	-0.060		
PM 2.5	-0.054		
Pb	0.000		
NH3	0.000		

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.307	25	No
NOx	5.140	25	No
CO	-2.052		
SOx	0.090		
PM 10	-0.060		
PM 2.5	-0.054		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.307		
NOx	5.140		
CO	-2.052		
SOx	0.090		
PM 10	-0.060		
PM 2.5	-0.054		
Pb	0.000		
NH3	0.000		

2036

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.527	25	No
NOx	8.928	25	No
CO	-3.833		
SOx	0.148		
PM 10	-0.114		
PM 2.5	-0.103		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.527	25	No
NOx	8.928	25	No
CO	-3.833		
SOx	0.148		
PM 10	-0.114		
PM 2.5	-0.103		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.527		
NOx	8.928		
CO	-3.833		
SOx	0.148		
PM 10	-0.114		
PM 2.5	-0.103		
Pb	0.000		
NH3	0.000		

2037

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.558	25	No
NOx	9.530	25	No
CO	-4.320		
SOx	0.150		
PM 10	-0.130		
PM 2.5	-0.117		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.558	25	No
NOx	9.530	25	No
CO	-4.320		
SOx	0.150		
PM 10	-0.130		
PM 2.5	-0.117		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.558		
NOx	9.530		
CO	-4.320		
SOx	0.150		
PM 10	-0.130		
PM 2.5	-0.117		
Pb	0.000		
NH3	0.000		

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.558	25	No
NOx	9.530	25	No
CO	-4.320		
SOx	0.150		
PM 10	-0.130		
PM 2.5	-0.117		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.558	25	No
NOx	9.530	25	No
CO	-4.320		
SOx	0.150		
PM 10	-0.130		
PM 2.5	-0.117		
Pb	0.000		
NH3	0.000		

EIS for T-7A Recapitalization at Sheppard AFB, Texas
AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.558		
NOx	9.530		
CO	-4.320		
SOx	0.150		
PM 10	-0.130		
PM 2.5	-0.117		
Pb	0.000		
NH3	0.000		

The Criteria Pollutants (or their precursors) with a General Conformity threshold listed in the table above are pollutants within one or more designated nonattainment or maintenance area/s for the associated National Ambient Air Quality Standard (NAAQS). These pollutants are driving this GCR Applicability Analysis. Pollutants exceeding the GCR thresholds must be further evaluated potentially through a GCR Determination.

The pollutants without a General Conformity threshold are pollutants only within areas designated attainment for the associated NAAQS. These pollutants have an insignificance indicator for VOC, NO_x, CO, SO_x, PM 10, PM 2.5, and NH₃ of 250 ton/yr (Prevention of Significant Deterioration major source threshold) and 25 ton/yr for Pb (GCR de minimis value). Pollutants below their insignificance indicators are at rates so insignificant that they will not cause or contribute to an exceedance of one or more NAAQSs. These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Refer to the *Level II, Air Quality Quantitative Assessment Insignificance Indicators* for further details.

None of the annual net change in estimated emissions associated with this action are above the GCR threshold values established at 40 CFR 93.153 (b); therefore, the proposed Action has an insignificant impact on Air Quality and a General Conformity Determination is not applicable.

Carolyn Hein, Contractor

April 24, 2025

Name, Title

Date

VR-1146: Alternative 1 ACAM Detail Report (Low Flight Patterns)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 1, VR-1146 Low Flight Pattern

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

- Point of Contact

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1146)
3.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)
4.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1146)
5.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)
6.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1146)
7.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)
8.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1146)
9.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 10 T-7A Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 10
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, remove 9 T-38C Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	9
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, add 40 T-7A Low-Altitude Operations in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 40
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- **Activity Title:** 2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, remove 45 T-38C Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
 Engine Model: J85-GE-5R
 Primary Function: Trainer
 Aircraft has Afterburn: Yes
 Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	45
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, add 37 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.269080
SO _x	0.126835
NO _x	3.911738
CO	0.222851

Pollutant	Emissions Per Year (TONs)
PM 10	0.018966
PM 2.5	0.016595
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.015967
N ₂ O	0.003115

Pollutant	Emissions Per Year (TONs)
CO ₂	379.727822
CO ₂ e	381.000417

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.269080
SO _x	0.126835
NO _x	3.911738
CO	0.222851

Pollutant	Emissions Per Year (TONs)
PM 10	0.018966
PM 2.5	0.016595
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.015967
N ₂ O	0.003115

Pollutant	Emissions Per Year (TONs)
CO ₂	379.727822
CO ₂ e	381.000417

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 37
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, remove 46 T-38C Low-Altitude Operations in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	46
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, add 6 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.043635
SO _x	0.020568
NO _x	0.634336
CO	0.036138

Pollutant	Emissions Per Year (TONs)
PM 10	0.003076
PM 2.5	0.002691
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002589
N ₂ O	0.000505

Pollutant	Emissions Per Year (TONs)
CO ₂	61.577485
CO ₂ e	61.783851

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.043635
SO _x	0.020568
NO _x	0.634336
CO	0.036138

Pollutant	Emissions Per Year (TONs)
PM 10	0.003076
PM 2.5	0.002691
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.002589
N ₂ O	0.000505

Pollutant	Emissions Per Year (TONs)
CO ₂	61.577485
CO ₂ e	61.783851

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 6
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, remove 12 T-38C Low-Altitude Operations in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	12
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

VR-1146: Alternative 2 ACAM Report (Low Flight Patterns)

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF CONFORMITY ANALYSIS (ROCA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2, VR-1146 Low Flight Pattern

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Analysis: Total reasonably foreseeable net change in direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" (highest annual emissions) and "steady state" (no net gain/loss in emission stabilized and the action is fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

EIS for T-7A Recapitalization at Sheppard AFB, Texas
AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

All emissions estimates were derived from various sources using the methods, algorithms, and emission factors from the most current *Air Emissions Guide for Air Force Stationary Sources*, *Air Emissions Guide for Air Force Mobile Sources*, and/or *Air Emissions Guide for Air Force Transitory Sources*. For greater details of this analysis, refer to the Detail ACAM Report.

_____ applicable
 X not applicable

Conformity Analysis Summary:

2034

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.112	25	No
NOx	1.420	25	No
CO	0.819		
SOx	0.070		
PM 10	0.034		
PM 2.5	0.030		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.112	25	No
NOx	1.420	25	No
CO	0.819		
SOx	0.070		
PM 10	0.034		
PM 2.5	0.030		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.112		
NOx	1.420		
CO	0.819		
SOx	0.070		
PM 10	0.034		
PM 2.5	0.030		
Pb	0.000		
NH3	0.000		

2035

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.416	25	No
NOx	6.553	25	No
CO	-1.363		
SOx	0.156		
PM 10	-0.031		
PM 2.5	-0.029		
Pb	0.000		
NH3	0.000		

EIS for T-7A Recapitalization at Sheppard AFB, Texas
AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.416	25	No
NOx	6.553	25	No
CO	-1.363		
SOx	0.156		
PM 10	-0.031		
PM 2.5	-0.029		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.416		
NOx	6.553		
CO	-1.363		
SOx	0.156		
PM 10	-0.031		
PM 2.5	-0.029		
Pb	0.000		
NH3	0.000		

2036

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.689	25	No
NOx	11.259	25	No
CO	-3.614		
SOx	0.226		
PM 10	-0.100		
PM 2.5	-0.090		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.689	25	No
NOx	11.259	25	No
CO	-3.614		
SOx	0.226		
PM 10	-0.100		
PM 2.5	-0.090		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.689		
NOx	11.259		
CO	-3.614		
SOx	0.226		
PM 10	-0.100		
PM 2.5	-0.090		
Pb	0.000		
NH3	0.000		

2037

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.732	25	No
NOx	12.065	25	No
CO	-4.219		
SOx	0.231		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.732	25	No
NOx	12.065	25	No
CO	-4.219		
SOx	0.231		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.732		
NOx	12.065		
CO	-4.219		
SOx	0.231		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.732	25	No
NOx	12.065	25	No
CO	-4.219		
SOx	0.231		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.732	25	No
NOx	12.065	25	No
CO	-4.219		
SOx	0.231		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.732		
NOx	12.065		
CO	-4.219		
SOx	0.231		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		

The Criteria Pollutants (or their precursors) with a General Conformity threshold listed in the table above are pollutants within one or more designated nonattainment or maintenance area/s for the associated National Ambient Air Quality Standard (NAAQS). These pollutants are driving this GCR Applicability Analysis. Pollutants exceeding the GCR thresholds must be further evaluated potentially through a GCR Determination.

The pollutants without a General Conformity threshold are pollutants only within areas designated attainment for the associated NAAQS. These pollutants have an insignificance indicator for VOC, NO_x, CO, SO_x, PM 10, PM 2.5, and NH₃ of 250 ton/yr (Prevention of Significant Deterioration major source threshold) and 25 ton/yr for Pb (GCR de minimis value). Pollutants below their insignificance indicators are at rates so insignificant that they will not cause or contribute to an exceedance of one or more NAAQSs. These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Refer to the *Level II, Air Quality Quantitative Assessment Insignificance Indicators* for further details.

None of the annual net change in estimated emissions associated with this action are above the GCR threshold values established at 40 CFR 93.153 (b); therefore, the proposed Action has an insignificant impact on Air Quality and a General Conformity Determination is not applicable.

Carolyn Hein, Contractor

April 24, 2025

Name, Title

Date

VR-1146: Alternative 2 ACAM Detail Report (Low Flight Patterns)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 2, VR-1146 Low Flight Pattern

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

- Point of Contact

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1146)
3.	Aircraft	2034: Add T-38C MTR Low-Altitude Operations (VR-1146)
4.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1146)
5.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)
6.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1146)
7.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)
8.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1146)
9.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 13 T-7A Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.094542
SO _x	0.044564
NO _x	1.374394
CO	0.078299

Pollutant	Emissions Per Year (TONs)
PM 10	0.006664
PM 2.5	0.005831
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gases:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005610
N ₂ O	0.001095

Pollutant	Emissions Per Year (TONs)
CO ₂	133.417884
CO ₂ e	133.865012

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.094542
SO _x	0.044564
NO _x	1.374394
CO	0.078299

Pollutant	Emissions Per Year (TONs)
PM 10	0.006664
PM 2.5	0.005831
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.005610
N ₂ O	0.001095

Pollutant	Emissions Per Year (TONs)
CO ₂	133.417884
CO ₂ e	133.865012

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 13
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 17 T-38C Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.017927
SO _x	0.025575
NO _x	0.045892
CO	0.740723

Pollutant	Emissions Per Year (TONs)
PM 10	0.027009
PM 2.5	0.024141
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003220
N ₂ O	0.000628

Pollutant	Emissions Per Year (TONs)
CO ₂	76.568623
CO ₂ e	76.825230

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.017927
SO _x	0.025575
NO _x	0.045892
CO	0.740723

Pollutant	Emissions Per Year (TONs)
PM 10	0.027009
PM 2.5	0.024141
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003220
N ₂ O	0.000628

Pollutant	Emissions Per Year (TONs)
CO ₂	76.568623
CO ₂ e	76.825230

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	17
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, add 50 T-7A Low-Altitude Operations in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.363622
SO _x	0.171399
NO _x	5.286133
CO	0.301149

Pollutant	Emissions Per Year (TONs)
PM 10	0.025630
PM 2.5	0.022426
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.021577
N ₂ O	0.004210

Pollutant	Emissions Per Year (TONs)
CO ₂	513.145706
CO ₂ e	514.865429

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.363622
SO _x	0.171399
NO _x	5.286133
CO	0.301149

Pollutant	Emissions Per Year (TONs)
PM 10	0.025630
PM 2.5	0.022426
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.021577
N ₂ O	0.004210

Pollutant	Emissions Per Year (TONs)
CO ₂	513.145706
CO ₂ e	514.865429

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 50
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, remove 57 T-38C Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.060107
SO _x	-0.085752
NO _x	-0.153873
CO	-2.483601

Pollutant	Emissions Per Year (TONs)
PM 10	-0.090560
PM 2.5	-0.080943
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010795
N ₂ O	-0.002106

Pollutant	Emissions Per Year (TONs)
CO ₂	-256.730088
CO ₂ e	-257.590477

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.060107
SO _x	-0.085752
NO _x	-0.153873
CO	-2.483601

Pollutant	Emissions Per Year (TONs)
PM 10	-0.090560
PM 2.5	-0.080943
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010795
N ₂ O	-0.002106

Pollutant	Emissions Per Year (TONs)
CO ₂	-256.730088
CO ₂ e	-257.590477

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	57
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, add 46 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.334532
SO _x	0.157687
NO _x	4.863242
CO	0.277057

Pollutant	Emissions Per Year (TONs)
PM 10	0.023579
PM 2.5	0.020632
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019851
N ₂ O	0.003873

Pollutant	Emissions Per Year (TONs)
CO ₂	472.094049
CO ₂ e	473.676195

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.334532
SO _x	0.157687
NO _x	4.863242
CO	0.277057

Pollutant	Emissions Per Year (TONs)
PM 10	0.023579
PM 2.5	0.020632
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.019851
N ₂ O	0.003873

Pollutant	Emissions Per Year (TONs)
CO ₂	472.094049
CO ₂ e	473.676195

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 46
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, remove 58 T-38C Low-Altitude Operations in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.061161
SO _x	-0.087256
NO _x	-0.156572
CO	-2.527173

Pollutant	Emissions Per Year (TONs)
PM 10	-0.092149
PM 2.5	-0.082363
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010985
N ₂ O	-0.002143

Pollutant	Emissions Per Year (TONs)
CO ₂	-261.234125
CO ₂ e	-262.109608

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.061161
SO _x	-0.087256
NO _x	-0.156572
CO	-2.527173

Pollutant	Emissions Per Year (TONs)
PM 10	-0.092149
PM 2.5	-0.082363
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.010985
N ₂ O	-0.002143

Pollutant	Emissions Per Year (TONs)
CO ₂	-261.234125
CO ₂ e	-262.109608

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	58
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, add 8 T-7A Low-Altitude Operations in VR-1146 with 108 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.058179
SO _x	0.027424
NO _x	0.845781
CO	0.048184

Pollutant	Emissions Per Year (TONs)
PM 10	0.004101
PM 2.5	0.003588
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003452
N ₂ O	0.000674

Pollutant	Emissions Per Year (TONs)
CO ₂	82.103313
CO ₂ e	82.378469

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.058179
SO _x	0.027424
NO _x	0.845781
CO	0.048184

Pollutant	Emissions Per Year (TONs)
PM 10	0.004101
PM 2.5	0.003588
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.003452
N ₂ O	0.000674

Pollutant	Emissions Per Year (TONs)
CO ₂	82.103313
CO ₂ e	82.378469

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 108
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 8
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, remove 15 T-38C Low-Altitude Operations in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.015818
SO _x	-0.022566
NO _x	-0.040493
CO	-0.653579

Pollutant	Emissions Per Year (TONs)
PM 10	-0.023832
PM 2.5	-0.021301
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002841
N ₂ O	-0.000554

Pollutant	Emissions Per Year (TONs)
CO ₂	-67.560550
CO ₂ e	-67.786968

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.015818
SO _x	-0.022566
NO _x	-0.040493
CO	-0.653579

Pollutant	Emissions Per Year (TONs)
PM 10	-0.023832
PM 2.5	-0.021301
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002841
N ₂ O	-0.000554

Pollutant	Emissions Per Year (TONs)
CO ₂	-67.560550
CO ₂ e	-67.786968

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	15
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

VR-1146: Alternative 3 ACAM Report (Low Flight Patterns)

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF CONFORMITY ANALYSIS (ROCA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Department of the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.24a

a. Action Location:

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

b. Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3, VR-1146 Low Flight Pattern

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2034

e. Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T-38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

f. Point of Contact:

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

2. Analysis: Total reasonably foreseeable net change in direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" (highest annual emissions) and "steady state" (no net gain/loss in emission stabilized and the action is fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

All emissions estimates were derived from various sources using the methods, algorithms, and emission factors from the most current *Air Emissions Guide for Air Force Stationary Sources*, *Air Emissions Guide for Air Force Mobile Sources*, and/or *Air Emissions Guide for Air Force Transitory Sources*. For greater details of this analysis, refer to the Detail ACAM Report.

____ applicable
 X not applicable

Conformity Analysis Summary:

2034

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.063	25	No
NOx	1.033	25	No
CO	-0.332		
SOx	0.021		
PM 10	-0.009		
PM 2.5	-0.008		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.063	25	No
NOx	1.033	25	No
CO	-0.332		
SOx	0.021		
PM 10	-0.009		
PM 2.5	-0.008		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.063		
NOx	1.033		
CO	-0.332		
SOx	0.021		
PM 10	-0.009		
PM 2.5	-0.008		
Pb	0.000		
NH3	0.000		

2035

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.307	25	No
NOx	5.140	25	No
CO	-2.052		
SOx	0.090		
PM 10	-0.060		
PM 2.5	-0.054		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.307	25	No
NOx	5.140	25	No
CO	-2.052		
SOx	0.090		

EIS for T-7A Recapitalization at Sheppard AFB, Texas
AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
PM 10	-0.060		
PM 2.5	-0.054		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.307		
NOx	5.140		
CO	-2.052		
SOx	0.090		
PM 10	-0.060		
PM 2.5	-0.054		
Pb	0.000		
NH3	0.000		

2036

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.556	25	No
NOx	9.351	25	No
CO	-3.809		
SOx	0.162		
PM 10	-0.112		
PM 2.5	-0.101		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.556	25	No
NOx	9.351	25	No
CO	-3.809		
SOx	0.162		
PM 10	-0.112		
PM 2.5	-0.101		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.556		
NOx	9.351		
CO	-3.809		
SOx	0.162		
PM 10	-0.112		
PM 2.5	-0.101		
Pb	0.000		
NH3	0.000		

2037

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.704	25	No
NOx	11.644	25	No
CO	-4.199		
SOx	0.219		
PM 10	-0.120		

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.704	25	No
NOx	11.644	25	No
CO	-4.199		
SOx	0.219		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.704		
NOx	11.644		
CO	-4.199		
SOx	0.219		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		

2038 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Dallas-Fort Worth, TX			
VOC	0.704	25	No
NOx	11.644	25	No
CO	-4.199		
SOx	0.219		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		
Dallas-Fort Worth, TX			
VOC	0.704	25	No
NOx	11.644	25	No
CO	-4.199		
SOx	0.219		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		
NOT IN A REGULATORY AREA			
VOC	0.704		
NOx	11.644		
CO	-4.199		
SOx	0.219		
PM 10	-0.120		
PM 2.5	-0.108		
Pb	0.000		
NH3	0.000		

The Criteria Pollutants (or their precursors) with a General Conformity threshold listed in the table above are pollutants within one or more designated nonattainment or maintenance area/s for the associated National Ambient

Air Quality Standard (NAAQS). These pollutants are driving this GCR Applicability Analysis. Pollutants exceeding the GCR thresholds must be further evaluated potentially through a GCR Determination.

The pollutants without a General Conformity threshold are pollutants only within areas designated attainment for the associated NAAQS. These pollutants have an insignificance indicator for VOC, NO_x, CO, SO_x, PM 10, PM 2.5, and NH₃ of 250 ton/yr (Prevention of Significant Deterioration major source threshold) and 25 ton/yr for Pb (GCR de minimis value). Pollutants below their insignificance indicators are at rates so insignificant that they will not cause or contribute to an exceedance of one or more NAAQSs. These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Refer to the *Level II, Air Quality Quantitative Assessment Insignificance Indicators* for further details.

None of the annual net change in estimated emissions associated with this action are above the GCR threshold values established at 40 CFR 93.153 (b); therefore, the proposed Action has an insignificant impact on Air Quality and a General Conformity Determination is not applicable.

Carolyn Hein, Contractor
Name, Title

April 24, 2025
Date

VR-1146: Alternative 3 ACAM Detail Report (Low Flight Patterns)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: SHEPPARD AFB

State(s): Texas, Oklahoma

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Action Title: T-7A Recapitalization at Sheppard AFB - Alternative 3, VR-1146 Low Flight Pattern

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2034

- Action Purpose and Need:

The purpose of the Proposed Action is to continue the T-7A recapitalization program to prepare pilots to operate modern fourth and fifth generation aircraft. The need for the Proposed Action is to provide infrastructure and training systems to support the newer T-7A aircraft, allow for enhanced and improved flight and simulator training, and ensure DAF pilot training requirements are met. By 2031, more than 60 percent of the Combat Air Force will be comprised of fifth generation aircraft, requiring a modern, capable training platform with capabilities beyond those available with the T-38C. Additionally, training systems provided with the newer T-7A aircraft allow for enhanced and improved flight and simulator training. The T-7A recapitalization program will allow DAF to provide more efficient and effective instructor and pilot training for operating fourth and fifth generation aircraft. T-7A recapitalization at Sheppard AFB would allow DAF to continue the geographically phased T-7A recapitalization sequence, ensuring DAF pilot training requirements are met.

- Action Description:

The Proposed Action is recapitalization of the T-38C flight training program at Sheppard AFB with T-7A aircraft. Recapitalization entails replacement of all T-38C aircraft assigned to Sheppard AFB with T-7A aircraft; transition of aircraft operations at Sheppard AFB and associated SUA from the T-38C to the T-7A; temporary changes to the number of personnel and dependents in the Sheppard AFB region; and construction of and upgrades to operations, support, and maintenance facilities to support pilot training and aircraft operation and maintenance.

For Alternative 1, Sheppard AFB would receive up to 108 T-7A aircraft and perform sufficient operations for sustaining pilot training while simultaneously phasing out the T 38C aircraft. Alternative 2 would also result in up to 108 T-7A aircraft being delivered to Sheppard AFB; however, T-7A operations would be performed at an operational tempo approximately 25 percent greater than Alternative 1 to cover a scenario in which DAF requires a surge or increase in pilot training operations above the current plan. For Alternative 3, Sheppard AFB would receive up to 131 T-7A aircraft and T-7A operations would be approximately 22 percent greater than aircraft operations for Alternative 1. The No Action Alternative would not implement T-7A recapitalization at Sheppard AFB.

- Point of Contact

Name: Carolyn Hein

Title: Contractor

Organization: HDR

Email:

Phone Number:

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	2034: Add T-7A MTR Low-Altitude Operations (VR-1146)
3.	Aircraft	2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)
4.	Aircraft	2035: Add T-7A MTR Low-Altitude Operations (VR-1146)
5.	Aircraft	2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)
6.	Aircraft	2036: Add T-7A MTR Low-Altitude Operations (VR-1146)
7.	Aircraft	2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)
8.	Aircraft	2037: Add T-7A MTR Low-Altitude Operations (VR-1146)
9.	Aircraft	2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2034: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, add 10 T-7A Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gases:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.072724
SO _x	0.034280
NO _x	1.057227
CO	0.060230

Pollutant	Emissions Per Year (TONs)
PM 10	0.005126
PM 2.5	0.004485
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.004315
N ₂ O	0.000842

Pollutant	Emissions Per Year (TONs)
CO ₂	102.629141
CO ₂ e	102.973086

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 28
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 10
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- **Activity Title:** 2034: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2034, remove 9 T-38C Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2034

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009491
SO _x	-0.013540
NO _x	-0.024296
CO	-0.392147

Pollutant	Emissions Per Year (TONs)
PM 10	-0.014299
PM 2.5	-0.012781
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.001704
N ₂ O	-0.000333

Pollutant	Emissions Per Year (TONs)
CO ₂	-40.536330
CO ₂ e	-40.672181

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	131
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	9
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2035: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, add 40 T-7A Low-Altitude Operations in VR-1146 with 76 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.290897
SO _x	0.137119
NO _x	4.228906
CO	0.240919

Pollutant	Emissions Per Year (TONs)
PM 10	0.020504
PM 2.5	0.017941
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017262
N ₂ O	0.003368

Pollutant	Emissions Per Year (TONs)
CO ₂	410.516565
CO ₂ e	411.892343

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 76
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 40
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2035: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2035, remove 45 T-38C Low-Altitude Operations in VR-1146 with 28 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2035

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.047453
SO _x	-0.067699
NO _x	-0.121478
CO	-1.960737

Pollutant	Emissions Per Year (TONs)
PM 10	-0.071495
PM 2.5	-0.063903
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008522
N ₂ O	-0.001663

Pollutant	Emissions Per Year (TONs)
CO ₂	-202.681649
CO ₂ e	-203.360903

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

5.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	28
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	45
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

5.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2036: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, add 41 T-7A Low-Altitude Operations in VR-1146 with 124 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.298170
SO _x	0.140547
NO _x	4.334629
CO	0.246942

Pollutant	Emissions Per Year (TONs)
PM 10	0.021016
PM 2.5	0.018389
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017693
N ₂ O	0.003452

Pollutant	Emissions Per Year (TONs)
CO ₂	420.779479
CO ₂ e	422.189652

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.298170
SO _x	0.140547
NO _x	4.334629
CO	0.246942

Pollutant	Emissions Per Year (TONs)
PM 10	0.021016
PM 2.5	0.018389
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.017693
N ₂ O	0.003452

Pollutant	Emissions Per Year (TONs)
CO ₂	420.779479
CO ₂ e	422.189652

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 124
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 41
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- **Activity Title:** 2036: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2036, remove 46 T-38C Low-Altitude Operations in VR-1146 with 56 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2036

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.048507
SO _x	-0.069203
NO _x	-0.124178
CO	-2.004309

Pollutant	Emissions Per Year (TONs)
PM 10	-0.073084
PM 2.5	-0.065323
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.008712
N ₂ O	-0.001700

Pollutant	Emissions Per Year (TONs)
CO ₂	-207.185685
CO ₂ e	-207.880034

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	56
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	46
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2037: Add T-7A MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, add 22 T-7A Low-Altitude Operations in VR-1146 with 131 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.159994
SO _x	0.075415
NO _x	2.325898
CO	0.132506

Pollutant	Emissions Per Year (TONs)
PM 10	0.011277
PM 2.5	0.009867
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009494
N ₂ O	0.001852

Pollutant	Emissions Per Year (TONs)
CO ₂	225.784111
CO ₂ e	226.540789

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.159994
SO _x	0.075415
NO _x	2.325898
CO	0.132506

Pollutant	Emissions Per Year (TONs)
PM 10	0.011277
PM 2.5	0.009867
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	0.009494
N ₂ O	0.001852

Pollutant	Emissions Per Year (TONs)
CO ₂	225.784111
CO ₂ e	226.540789

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-7A
Engine Model: F404-GE-102
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

8.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 131
Flight Operation Cycle Type: LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft: 22
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 0
Takeoff [Military] (mins): 38
Takeoff [Afterburn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
Afterburn (mins): 0

8.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1,000 pounds
EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{AFTERBURN}$: Aircraft Emissions for Afterburner Power Setting (TONs)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County(s): Atoka, OK; Bryan, OK; Carter, OK; Coal, OK; Garvin, OK; Grady, OK; Jefferson, OK; Johnston, OK; Love, OK; Marshall, OK; Murray, OK; Pontotoc, OK; Stephens, OK; Clay, TX; Cooke, TX; Denton, TX; Grayson, TX; Jack, TX; Montague, TX; Wise, TX

Regulatory Area(s): Dallas-Fort Worth, TX; Dallas-Fort Worth, TX; NOT IN A REGULATORY AREA

- Activity Title: 2037: Remove T-38C MTR Low-Altitude Operations (VR-1146)

- Activity Description:

In 2037, remove 12 T-38C Low-Altitude Operations in VR-1146 with 47 aircraft.

- Activity Start Date

Start Month: 1
Start Year: 2037

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

- Activity Emissions of Criteria Pollutants [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.012654
SO _x	-0.018053
NO _x	-0.032394
CO	-0.522863

Pollutant	Emissions Per Year (TONs)
PM 10	-0.019065
PM 2.5	-0.017041
Pb	0.000000
NH ₃	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LFP Flight Operations part]:

Pollutant	Emissions Per Year (TONs)
CH ₄	-0.002273
N ₂ O	-0.000443

Pollutant	Emissions Per Year (TONs)
CO ₂	-54.048440
CO ₂ e	-54.229574

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: T-38C
Engine Model: J85-GE-5R
Primary Function: Trainer
Aircraft has Afterburn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5
Idle	520.00	16.80	1.07	1.08	177.45	4.70	4.23
Approach	689.00	7.96	1.07	0.84	119.23	2.42	2.17
Intermediate	1030.00	2.78	1.07	0.70	65.07	1.79	1.61
Military	2220.00	0.75	1.07	1.92	30.99	1.13	1.01
Afterburn	7695.00	6.97	1.07	6.23	53.43	0.25	0.23

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1,000 lb fuel)

	Fuel Flow	CH ₄	N ₂ O	CO ₂	CO ₂ e
Idle	520.00	0.13	0.03	3203.44	3214.64
Approach	689.00	0.13	0.03	3203.44	3214.64
Intermediate	1030.00	0.13	0.03	3203.44	3214.64
Military	2220.00	0.13	0.03	3203.44	3214.64
Afterburn	7695.00	0.13	0.03	3203.44	3214.64

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	47
Flight Operation Cycle Type:	LFP (Low Flight Pattern)
Number of Annual Flight Operation Cycles for all Aircraft:	12
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	0
Takeoff [Military] (mins):	38
Takeoff [Afterburn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with afterburner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used).

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
Afterburn (mins):	0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)

NE: Number of Engines

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1,000 pounds

EF: Emission Factor (lb/1,000 lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{\text{TRIM}} = AEPS_{\text{IDLE}} + AEPS_{\text{APPROACH}} + AEPS_{\text{INTERMEDIATE}} + AEPS_{\text{MILITARY}} + AEPS_{\text{AFTERBURN}}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{\text{IDLE}}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{\text{APPROACH}}$: Aircraft Emissions for Approach Power Setting (TONs)
 $AEPS_{\text{INTERMEDIATE}}$: Aircraft Emissions for Intermediate Power Setting (TONs)
 $AEPS_{\text{MILITARY}}$: Aircraft Emissions for Military Power Setting (TONs)
 $AEPS_{\text{AFTERBURN}}$: Aircraft Emissions for Afterburner Power Setting (TONs)