APPENDIX A
ACRONYMS AND ABBREVIATIONS

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit
56 FW	56th Fighter Wing
56 RMO	56th Range Management Office
162 WG	162nd Wing
355 WG	355th Wing
A/B	afterburner thrust
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
AETC	Air Education and Training Command
AFB	Air Force Base
AFSEC	Air Force Safety Center
AGL	above ground level
AHAS	Avian Hazard Advisory Safety System
Albuquerque Center	Albuquerque Air Route Traffic Control Center
ANG	Air National Guard
ANGB	Air National Guard Base
APE	area of potential effect
AQCR	Air Quality Control Region
ATCAA	Air Traffic Control Assigned Airspace
ATS	Air Traffic Service
AZGFD	Arizona Game and Fish Department
BASH	Bird/Wildlife Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
CAA	Clean Air Act
CDNL	C-weighted Day-Night Average Sound Level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
DAF	Department of the Air Force
DAFI	Department of the Air Force Instruction
DAFMAN	Department of the Air Force Manual
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
DNL	Day-Night Average Sound Level
DNWG	Defense Noise Working Group
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FICUN	Federal Interagency Committee on Urban Noise
FL	Flight Level
FONSI	Finding of No Significant Impact
GHG	greenhouse gases
HAPs	hazardous air pollutants
Hz	Hertz
IFR	Instrument Flight Rules
IWG	Interagency Working Group
kHz	kilohertz
L_{dnmr}	Onset Rate Adjusted Day-Night Sound Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
LOA	Letter of Agreement
L_x	Percentile Level
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
MIL	military-rated thrust

MOA	Military Operations Area
MSL	mean sea level
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
NOTAM	Notice to Air Missions
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone
Pb	lead
$PM_{2.5}$	particulate matter less than or equal to 2.5 micrometers
PM_{10}	particulate matter less than or equal to 10 micrometers
PSD	Prevention of Significant Deterioration
psf	pounds per square foot
ROD	Record of Decision
ROI	region of influence
SC-CO_2	social cost of carbon dioxide
SC-GHG	social cost of greenhouse gas emissions
SEL	Sound Exposure Level
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SOP	Standard Operating Procedures
SUA	Special Use Airspace
U.S.	United States
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USC	United States Code
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	Volatile Organic Compound

APPENDIX B
GLOSSARY

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Air Traffic Control Assigned Airspace (ATCAA). ATCAAs are not published on aeronautical charts and exist only when made available for military use by the Federal Aviation Administration (FAA). Air Traffic Control Assigned Airspace (ATCAAs) are designated in Letters of Agreement (LOAs) with the FAA and can be used to extend the usable airspace above the designated ceiling of a Military Operations Area (MOA). When requested, ATCAA is released by the FAA for military use when not required for other air traffic control purposes (notably, commercial air traffic). The FAA can recall it at any time. ATCAAs can support the same training activities that occur in MOAs. An ATCAA typically has the same horizontal boundaries of the underlying MOA and an agreed upon ceiling. Civilian and commercial traffic may transit an active ATCAA under FAA air traffic control guidance and procedures.

Altitude. The vertical elevation of an object above a surface. Altitude references for aircraft operations are presented in several units of measure: feet above ground level (AGL), feet above mean sea level (MSL), and Flight Level (FL). Definitions of these terms are as follows:

- **Above Ground Level** (AGL): AGL references are usually used at lower altitudes (almost always below 10,000 feet), when clearance from terrain is more of a concern for aircraft operation.
- **Mean Sea Level** (MSL): MSL altitudes are used most commonly across aviation when operating at or below 18,000 feet when clearance from terrain is less of a concern for aircraft operation.
- **Flight Level** (FL): FL is used to describe the cruising altitudes for aircraft traveling long distances above 18,000 feet. Flight Levels are given in hundreds of feet, e.g., FL300 is 30,000 feet.

Chaff. Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid detection or attack by enemy air defense systems and keep aircraft from being successfully targeted by weapons. A bundle of chaff consists of approximately 5 to 5.6 million aluminum-coated silica fibers. When dispensed from aircraft, the fibers form an electronic “cloud” that breaks the radar signal and temporarily hides the maneuvering aircraft from radar detection. The chaff bundle is packed inside a 1-inch by 1-inch by 8-inch rectangular tube or cartridge. The cartridge remains in the aircraft after the chaff bundle is deployed. Each chaff bundle has a 1-inch by 1-inch felt spacer that falls to the ground along with two 1-inch square by 0.125-inch-thick plastic end caps.

Controlling Agency. The FAA Air Traffic Control facility that exercises control of the airspace when the Special Use Area (SUA) area is not activated; a military Air Traffic Control facility may be assigned as the controlling agency.

Flare. Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid detection or attack by enemy air defense systems and keep aircraft from being successfully targeted by weapons. Flares ejected from aircraft provide high-temperature heat sources that mislead heat-sensitive or heat seeking targeting systems. Flares are primarily mixtures of magnesium and Teflon (polytetrafluoroethylene) molded into rectangular shapes (approximately 1-inch by 1-inch by 8 inches long). An individual flare weighs approximately 6.9 ounces. Typically, flares are wrapped with an aluminum-coated mylar or filament-reinforced tape (similar to duct tape) and inserted into an aluminum (0.03-inch-thick) case that is closed with a felt spacer and a small plastic end cap. The aluminum case remains inside the aircraft once the flare is deployed.

Instrument Flight Rules (IFR). A set of regulations that dictate how aircraft are to be operated under instrument meteorological conditions when the pilot is unable to navigate using visual references under Visual Flight Rules (VFR).

Military Operations Area (MOA). A MOA is a type of SUA designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers, low-altitude operations, etc. MOAs have defined spatial boundaries, as well as times when the airspace is available for military training. Specific activities allowed in MOAs, such as use of chaff and flares or supersonic flight, are considered attributes and can vary for different MOAs. As with restricted areas, MOAs can be designated as joint use and released by the using agency to the controlling agency which provides for the operation of non-participating aircraft through this airspace when it is not in use.

Non-participating civil and military aircraft flying under VFR may transit an active MOA by employing see-and-avoid procedures. When operating under IFR, non-participating aircraft must receive air traffic control clearance to enter an active MOA. All regulations governing the rules of flight apply within MOAs, to include right-of-way rules and minimal safe altitudes.

Military Training Routes (MTRs). Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots.

Letter of Agreement (LOA). An LOA is developed when the FAA Air Traffic Manager deems it necessary to clarify responsibilities of other persons/facilities/organizations when specific operational/procedural needs require their cooperation and concurrence.

Low-Altitude Tactical Navigation (LATN) Area. An area designated for low-altitude military operations. LATN areas are not designated on aeronautical charts because military pilots must adhere to the same VFR weather and speed restrictions as civilian pilots.

Restricted Area. A restricted area is SUA within which flight by non-participating aircraft is subject to restriction but is not wholly prohibited. Restricted areas are established when it is necessary to confine or segregate activities considered hazardous to non-participating aircraft and are often associated with military training ranges. They can be established as "joint use" by assigning an air traffic control facility as the controlling agency and by executing a joint use letter of procedure between the controlling agency and using agency. Flight within the restricted area is controlled by the using agency except when the area has been released to the controlling agency. Release by the using agency to the controlling agency provides for the operation of non-participating aircraft through this airspace when it is not in use or when appropriate separation can be provided (FAA Order JO 7400.2).

Sortie. A sortie is the flight of a single aircraft consisting of a takeoff, mission, and landing.

Special Use Airspace (SUA). SUA consists of defined dimensions of airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon non-participating aircraft operations, or both. The vertical limits of SUA are defined by designated altitude floors (the lowest altitude) and ceilings (the highest altitude). SUA is depicted on aeronautical charts by name with the altitudes, times of scheduled use, the controlling agency and the using agency. The controlling agency is the FAA Air Traffic Control facility that exercises control of the airspace when the SUA is not activated. The using agency is the military unit or other organization whose activity established the requirement for the SUA. A listing of all regulatory and non-regulatory SUA is published annually in FAA Order JO 7400.10, *Special Use Airspace*.

Using Agency. The military unit or other organization whose activity established the requirement for the SUA. The using agency is responsible for ensuring that: (1) the airspace is only used for its designated purpose; (2) proper scheduling procedures are established and utilized; (3) the controlling agency is kept informed of changes in scheduled activity, to include the completion of activities for the day; and (4) a point of contact is made available to enable the controlling agency to verify schedules, and coordinate access for emergencies, weather diversions, etc.

Visual Flight Rules (VFR). The regulations that specify the cloud and visibility limitations for aircraft operating with visual reference. The basic premise of VFR is that the pilot would be able to navigate and manipulate the aircraft with external cues only.

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APPENDIX C
BACKGROUND INFORMATION ON EXISTING SUA

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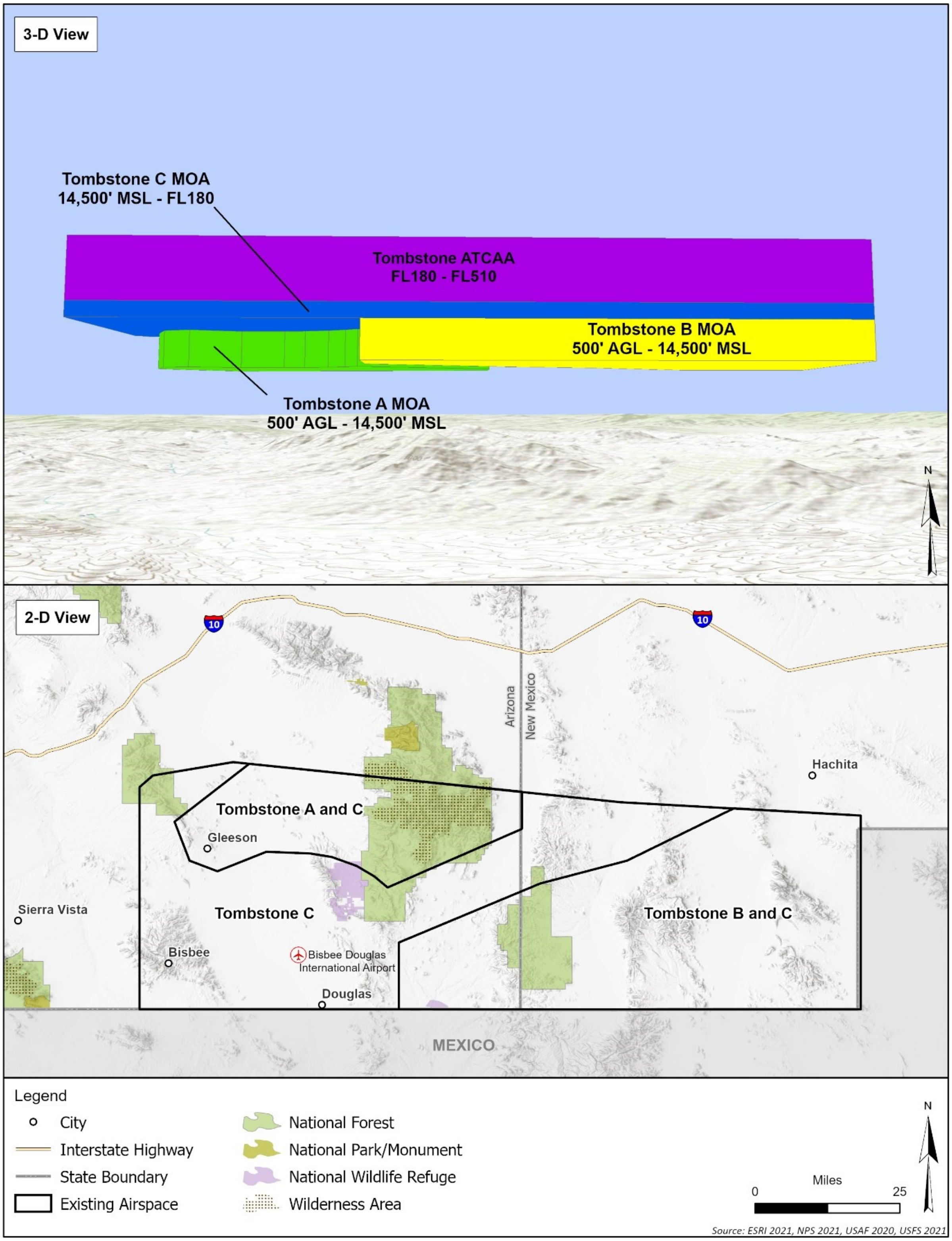
1 Background Information on Existing SUA

The Air Force-managed Special Use Airspace (SUA) associated with this Environmental Impact Statement (EIS) includes several Military Operations Areas (MOAs) (**Table 1**). The existing MOAs and their associated Air Traffic Control Assigned Airspace (ATCAAs) are illustrated in detail on **Figures 1** through **5**.

Name	Controlling Agency[1]	Using Agency[1]	Year Established[2]	Primary Legacy Aircraft	Primary Current Aircraft
Tombstone MOA	FAA, Albuquerque ARTCC	U.S. Air Force, 355th Wing, Davis-Monthan AFB, AZ	1976	A-7, F-4	A-10, F-16
Outlaw[3] MOA	FAA, Albuquerque ARTCC	U.S. Air Force, Commander, 162nd Fighter Group, Air National Guard, Tucson, AZ	Circa 1950	A-7, F-16	F-16, F-35
Jackal MOA	FAA, Albuquerque ARTCC	U.S. Air Force, Commander, 162nd Fighter Group, Air National Guard, Tucson, AZ	Circa 1950	A-7, F-16	F-16, F-35
Morenci MOA	FAA, Albuquerque ARTCC	162nd Tactical Fighter Group, Tucson, AZ	Circa 1950	A-7, F-16	F-16, F-35
Reserve MOA	FAA, Albuquerque ARTCC	U.S. Air Force, Commander, 162nd Fighter Training Group, Tucson, AZ	Circa 1950	A-7, F-16	F-16, F-35
Bagdad MOA	FAA, Albuquerque ARTCC	U.S. Air Force, 56th Fighter Wing, Luke AFB, AZ	Circa 1950	A-7, F-16	F-16, F-35
Gladden MOA	FAA, Albuquerque ARTCC	U.S. Air Force, 56th Fighter Wing, Luke AFB, AZ	Circa 1950	A-7, F-16	F-16, F-35
Sells MOA	FAA, Albuquerque ARTCC	U.S. Air Force, 56th Fighter Wing, Luke AFB, AZ	Circa 1940	A-7, F-16	F-16, F-35
Ruby MOA	FAA, Albuquerque ARTCC	162nd Tactical Fighter Group, Tucson, AZ	Circa 1950	A-7, F-16	F-16, F-35
Fuzzy MOA	FAA, Albuquerque ARTCC	162nd Tactical Fighter Group, Tucson, AZ	Circa 1950	A-7, F-16	F-16, F-35

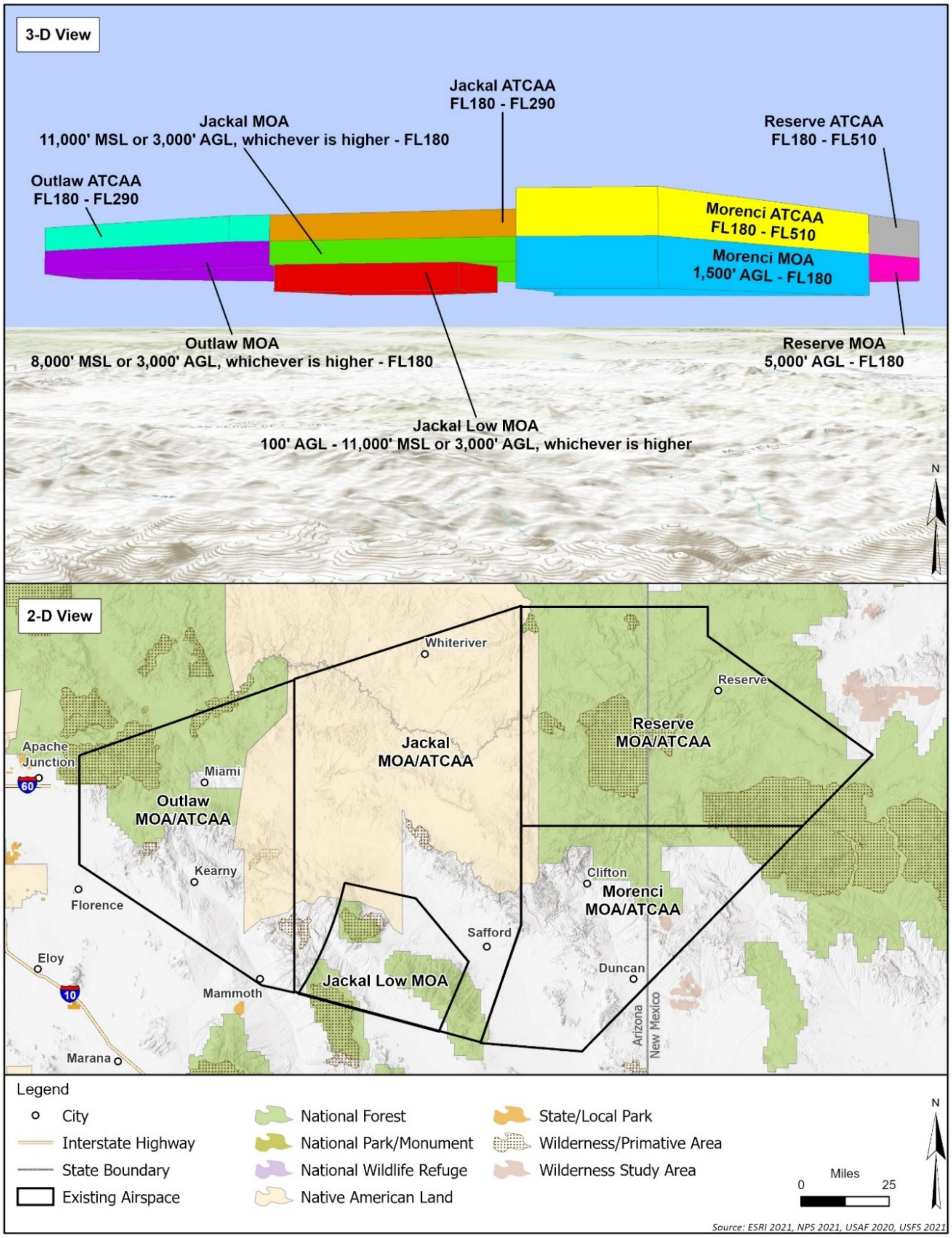
Notes: [1]The Controlling Agency and Using Agency in this table are as defined in FAA Order JO 7400.10 (published annually). Changes to nomenclature for Air Force groups over time are not updated in the order.
[2]The Military Operations Area Program was not formally established until 1975, although much of the areas now designated as MOAs were used for military training prior to the establishment of the program. Thus the “Year Established” for the MOAs that were in existence prior to 1975 are approximations based on historical knowledge provided by the Airspace Managers.
[3]The geographic area that constitutes the Outlaw and Jackal MOAs was associated with the former Williams AFB and was established as early as 1950. This airspace was officially renamed and configured to the current dimensions and nomenclature circa 1990.

Legend: FAA = Federal Aviation Administration; ARTCC = Air Route Traffic Control Center; MOA = Military Operations Area; EIS = Environmental Impact Statement; AFB = Air Force Base



Note: 3D Views are not to scale and are provided for illustrative purposes only.
Legend: ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = mean sea level.

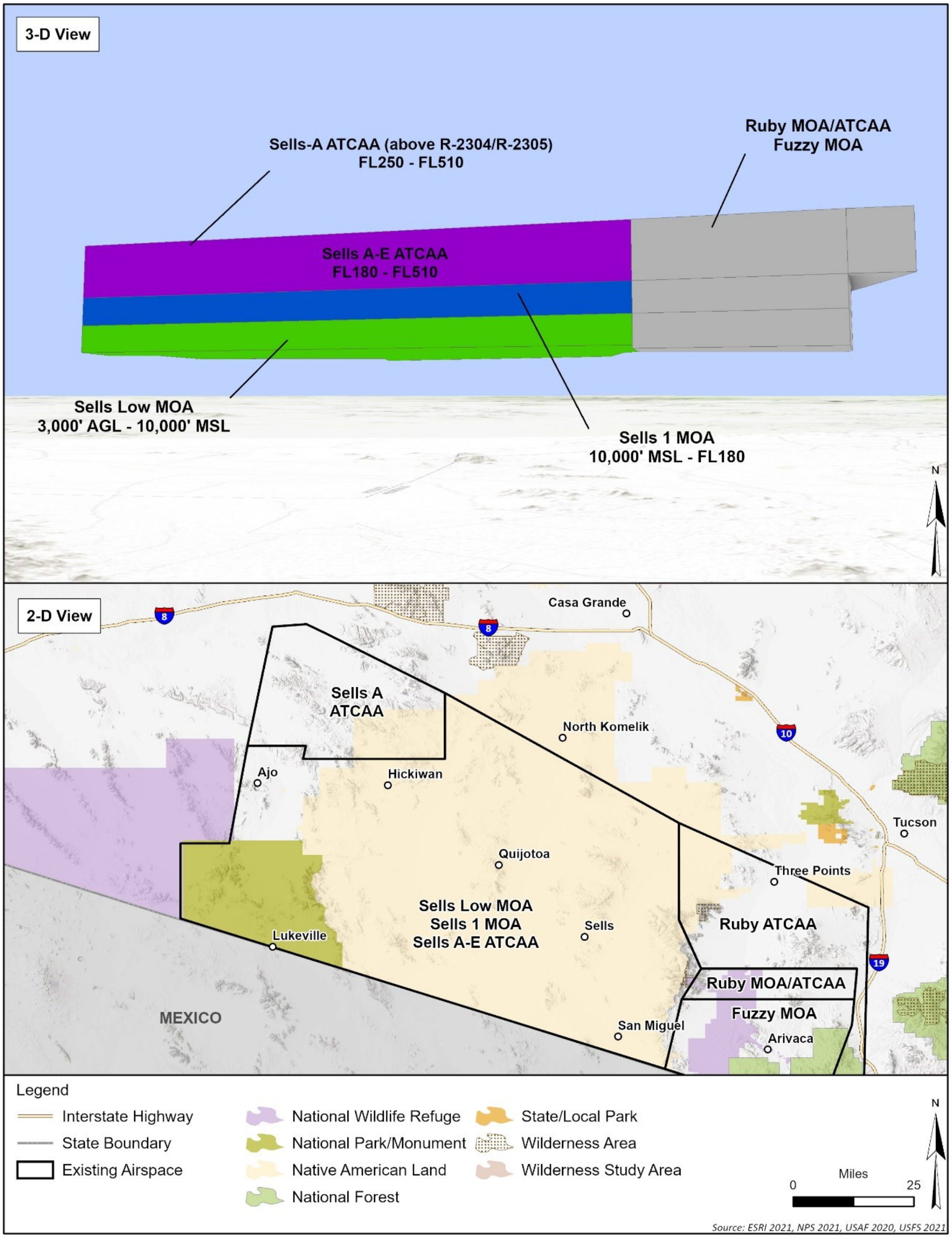
Figure 1 Existing Tombstone MOA/ATCAA



Notes: 3D Views are not to scale and are provided for illustrative purposes only. The ceilings of the Outlaw and Jackal ATCAAs are defined in an LOA as FL510, but the Air Force only receives the space above FL290 when the Outlaw and Jackal ATCAAs are scheduled with the Morenci and Reserve ATCAAs. The default ceiling is FL290.

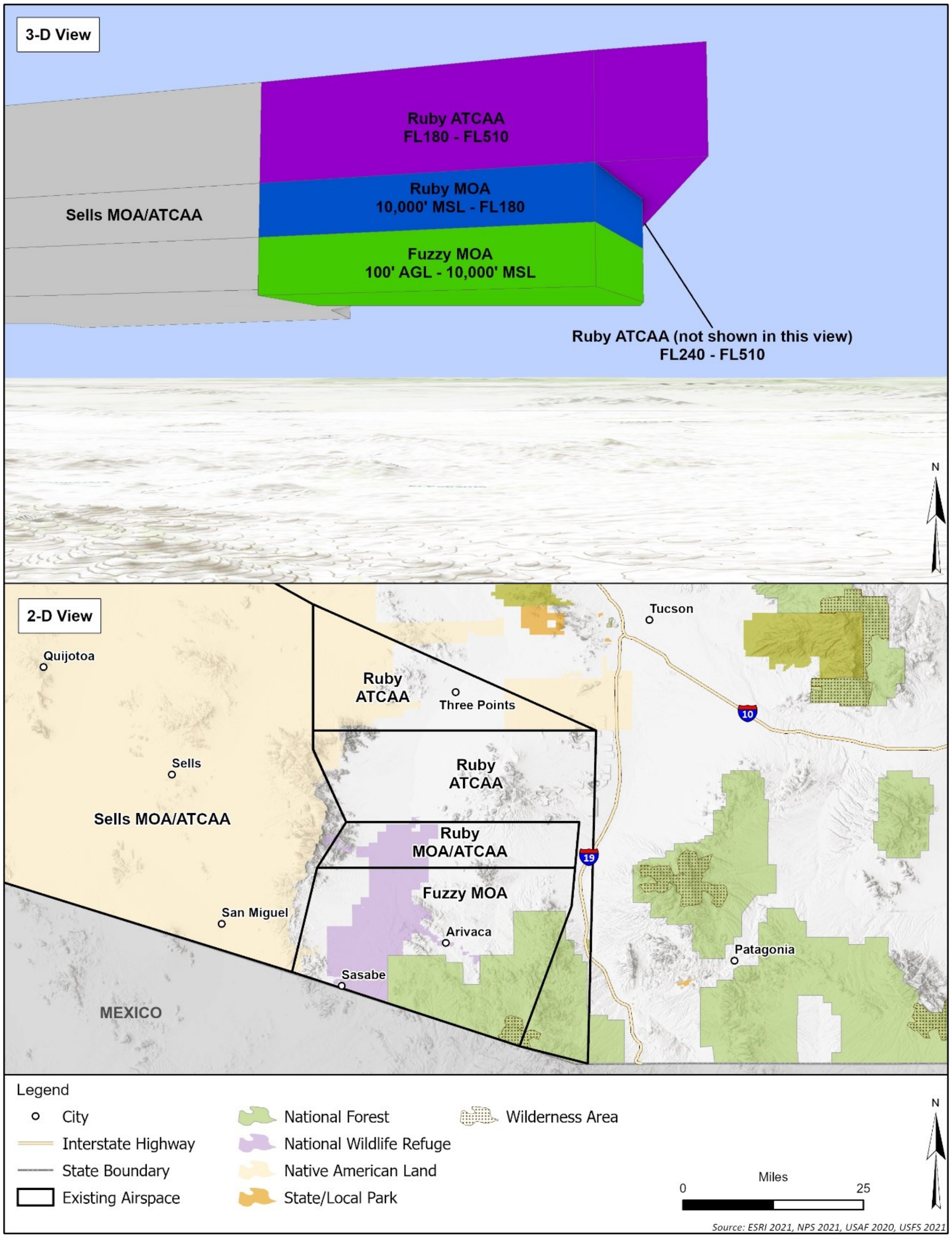
Legend: AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = mean sea level.

Figure 2 Existing Outlaw, Jackal, Morenci, Reserve MOAs/ATCAAs



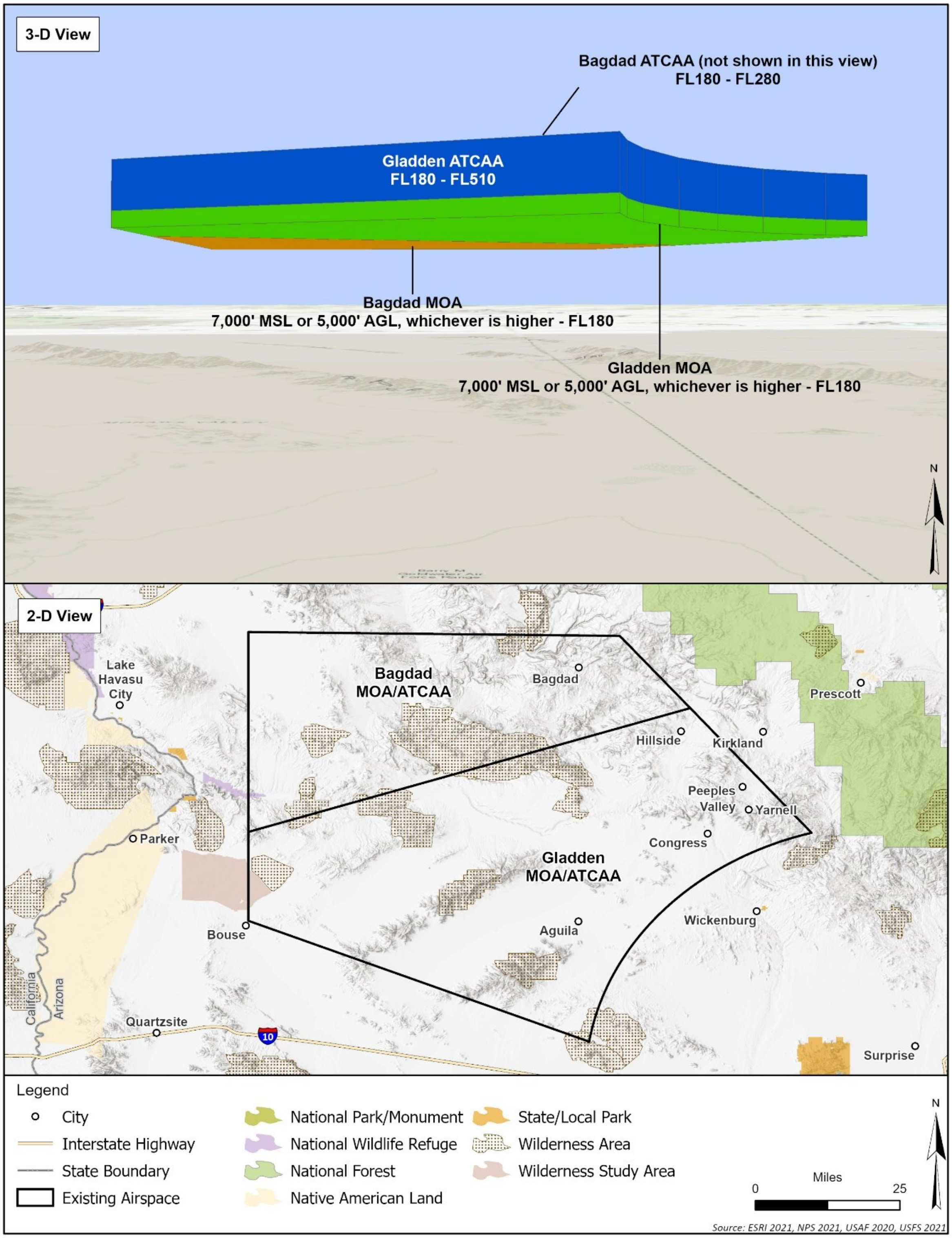
Note: 3D Views are not to scale and are provided for illustrative purposes only.
Legend: AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = mean sea level.

Figure 3 Existing Sells MOA/ATCAA



Note: 3D Views are not to scale and are provided for illustrative purposes only.
Legend: AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = mean sea level.

Figure 4 Existing Fuzzy, Ruby MOAs/ATCAA



Note: 3D Views are not to scale and are provided for illustrative purposes only.
Legend: AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = mean sea level.

Figure 5 Existing Gladden, Bagdad MOAs/ATCAAs

APPENDIX D1
PUBLIC INVOLVEMENT

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APPENDIX D1: PUBLIC INVOLVEMENT

for the

ENVIRONMENTAL IMPACT STATEMENT FOR
REGIONAL SPECIAL USE AIRSPACE OPTIMIZATION
TO SUPPORT AIR FORCE MISSIONS IN ARIZONA

United States Air Force Civil Engineer Center

Scoping Phase 1: January 18 to March 4, 2022

Scoping Phase 2: May 4 to June 3, 2022

August 2024

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TABLE OF CONTENTS

List of Tables

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1.0 BACKGROUND

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] § 4321 *et seq.*) establishes national policies and goals for the protection of the environment. The scoping process documented in this plan complies with public participation requirements of NEPA; Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500-1508); Air Force regulations (32 CFR 989); Executive Order 12372 (*Intergovernmental Review of Federal Programs*); and Federal Aviation Administration (FAA) regulations (FAA Order 1050.1F).

Public involvement is an integral part of developing a comprehensive Environmental Impact Statement (EIS). Department of Air Force (DAF) NEPA requirements for public involvement are set forth in 32 CFR Part 989; specifically, NEPA requires a process called "scoping" to solicit input from the public and interested agencies. To effectively define the full range of issues and alternatives to be evaluated in the EIS, the DAF solicited comments from interested local, state and federal elected officials and agencies, Tribes, as well as interested members of the public and others. The DAF requested comments concerning the proposed Special Use Airspace optimization, feasible alternatives, possible measures to mitigate, minimize and/or avoid adverse environmental impacts, and any other information relevant to the Proposed Action and any reasonable alternatives.

This Appendix presents a summary of the scoping process conducted by the DAF for the EIS for the Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona. The initial Scoping Comment Period for this EIS began with publication of a Notice of Intent (NOI) in the Federal Register on 18 January 2022, with comments requested no later than 4 March 2022 (herein referred to as *Scoping Phase 1: January 18 to March 4, 2022*). In respond to a Congressional inquiry and request from Senator Martin Heinrich (New Mexico), the DAF extended the scoping comment period through publication of an Amended NOI on 4 May 2022 in the Federal Register and comments were requested no later than 3 June 2022 (herein referred to as *Scoping Phase 2: May 4 to June 3, 2022*).

2.0 SCOPING PROCESS

The scoping process began with publication of a Notice of Intent (NOI) in the Federal Register (January 18, 2022) and concluded with the advertised comment period for the Phase 2 scoping comment period (June 4, 2022).

2.1 SCOPING PUBLIC NOTIFICATION

Several methods were used to notify the public of opportunities for involvement and methods to comment. These methods included:

- Publishing the NOI and the Amended NOI in the Federal Register;
- Mailing coordination letters to federal, state and local agencies, elected officials, and interested parties (Phase 1 and 2);
- Placing newspaper display advertisements in local and state newspapers in both English and Spanish (Phase 1 only);
- Notices published on all three installation websites by Public Affairs (Phase 1 and 2); and
- Creating and maintaining a publicly accessible website at www.ArizonaRegionalAirspaceEIS.com.

2.1.1 Federal Notice of Intent

As required by NEPA, the NOI was published in the *Federal Register* on January 18, 2022 (**Appendix A**). The notice provided an overview of the Proposed Action and Alternatives and the DAF's intent to prepare an EIS to study the potential environmental impacts. The NOI also announced the public scoping meeting dates, times, and locations.

An Amended NOI was published in the Federal Register on May 4, 2022 (**Appendix A**). The notice announced the extended public comment period. No public scoping meetings were held during the extended comment period.

2.1.2 Interagency Coordination

The DAF initiated direct contact with potentially interested and affected government agencies, government representatives, elected officials and other interested parties potentially affected through distribution of letters. All federal agencies with regulatory authority or land management or ownership status beneath affected airspace were asked if they wished to be a cooperating agency for this action. The letters announced the beginning of the scoping process, provided a map of the airspace, included a list of scoping meeting dates and locations, and requested that comments be submitted no later than March 4, 2022 to ensure consideration in the Draft EIS. **Appendix B** contains a representative sample of the letters that were distributed during Phase 1 as well as the distribution list for the letters. All letters contained two enclosures: (1) a map of the project area and (2) a list of the scoping meeting dates and locations. Samples of these enclosures are included at the end of **Appendix B**.

A Memorandum was issued to the same government agencies, government representatives, elected officials and other interested parties announcing the Amended NOI and the dates for the second scoping period. A copy of the Memorandum is provided in **Appendix B**.

2.1.3 Government-to-Government Consultation

The DAF initiated consultation with American Indian Tribes concurrent with the public scoping process. Letters were sent via email (the preferred method of communication) to 30 American Indian Tribes potentially affected by the Proposed Action and Alternatives to initiate government-to-government consultation. The Tribe distribution list and a sample of the letter provided to the Tribes is included in **Appendix B** for reference, but all Government-to-Government correspondence is provided in the EIS Appendices. The tribal members were invited to the scoping meetings to participate in the NEPA process, and Tribal leaders were offered personal meetings upon request to support National Historic Preservation Act Section 106 consultation. Tribal leaders were not given a comment deadline as government-to-government consultation will occur throughout the NEPA process. A copy of the Memorandum announcing the Amended NOI was also provided to all Tribes.

2.1.4 Press Release and Newspaper Advertisements

The DAF published display advertisements in local newspapers in English and Spanish approximately two weeks prior to the first scoping meeting. The advertisements provided the meeting information for the location applicable to that paper's distribution area. A sample of the newspaper advertisement can be found in **Appendix C**. Newspapers and the dates the advertisements were published are identified in **Table 1** (newspaper advertisements were only published for Phase 1).

The Public Affairs departments at each installation issued Press Releases on their respective websites and social media platforms for Phase 1 and Phase 2. The press releases mirrored the NOI and the Amended NOI.

Table 1. Newspaper Advertisements Schedule

Newspaper	Newspaper Type	Publication Date(s)
Ajo Copper News	Weekly	January 26, 2022
Superior Sun	Weekly	January 26, 2022
Wickenburg Sun	Weekly	January 26, 2022
El Defensor Chieftain	Weekly	January 27, 2022
Eastern Arizona Courier	Weekly	January 26, 2022
Bisbee Observer	Weekly	January 27, 2022
The Arizona Republic	Daily	January 26, 2022; February 4, 2022
West Valley View	Weekly	January 26, 2022
East Valley Tribune	Weekly	January 30, 2022
Arizona Daily Star	Daily	January 28, 2022; February 7, 2022

2.1.5 Project Website

The project website (https://www.ArizonaRegionalAirspaceEIS.com) provided information about the Proposed Action and Alternatives, project schedule and meeting locations, Virtual Scoping Presentation, copies of all documents and materials presented at the public meetings, comment methods and online comment submittal form. The site will be updated as the NEPA process progresses and is used as a primary means to notify the public of any changes to the schedule or project.

2.2 Scoping Meetings

Table 2 lists the dates and locations of the public scoping meetings. All meetings were open house style, 5:00 – 7:00 p.m. (Local). Due to rising COVID cases and restrictions on public gatherings, the Bagdad meeting was cancelled by the municipality. Residents in Bagdad could attend the Congress, AZ meeting (located approximately an hour away) or view the Virtual Presentation. All meeting attendees were provided a Welcome Fact Sheet. There were handouts specific to the Military Operations Area (MOA) on display (specific to the meeting location) and a fact sheet on chaff and flares at each meeting. Blank comment sheets were available at comment tables at each meeting. Poster displays were staffed by DAF representatives at every meeting to answer questions, poster topics included: the Proposed Action; preliminary alternatives and selection criteria; details of alternatives by MOA; and opportunities for public involvement in NEPA process. All meeting materials were also available on the project website.

Table 2. Schedule and Location of Scoping Meetings

Date	Location
Monday, February 7, 2022	Sonoran Desert Inn & Conference Center 55 South Orilla Avenue Ajo, AZ 85321
Tuesday, February 8, 2022	Superior Town Hall 199 N Lobb Avenue Superior, AZ 85173
Wednesday, February 9, 2022 CANCELED	Bagdad Event Center 121 Main Street Bagdad, AZ 86321
Thursday, February 10, 2022	Congress Fire Department 26733 Santa Fe Road Congress, AZ 85332
Tuesday, February 22, 2022	Village Hall 15 Jake Scott Street Reserve, NM 87830-0587
Wednesday, February 23, 2022	Clifton Community Center 100 North Coronado Blvd Clifton, AZ 85533
Thursday, February 24, 2022	Animas High School 1 Panther Blvd Animas, NM 88020

In total, 297 people attended the scoping meetings. **Table 3** presents the number of attendees who signed in at each meeting (all attendees were requested to sign in; however, it was not mandatory to do so) by attendee type.

Table 3. Meeting Participation

Attendees	Ajo, AZ 02/07/22	Superior, AZ 02/08/22	Bagdad, AZ 02/09/22	Congress, AZ 02/10/22	Reserve, NM 02/22/22	Clifton, AZ 02/23/22	Animas, NM 02/24/22
Members of the Public	27	17	-	80	7	9	119
Elected Official	-	5	-	-	1	1	-
Federal Agency	2	4	-	-	-	-	1
Tribe	-	3	-	-	-	-	-
State, Local Agency	-	-	-	2	-	2	2
Airport, Aviation Group	-	1	-	1	1	-	-
NGO/Other	-	5	-	-	1	-	6
Media present?	Yes	Yes	-	No	No	No	No
Meeting Total	29	35	Canceled	83	10	12	128
Scoping Total							**297**

3.0 SCOPING COMMENT SUMMARY

The public could comment during both scoping periods through multiple methods:

- **Written Comment Form –** written comment forms were provided at all scoping meetings; they could be completed and submitted during or after the scoping meeting. Written comment forms were also available for download on the project website.
- **Standard Mail or through Project Website –** The Air Force invited the public to submit comments by U.S. Postal Service or electronically through the project website. The mailing address

and website were announced in the NOI, Amended NOI, coordination letters, press release(s), display advertisements in local newspapers, on the poster displays, and in handout materials disseminated at all scoping meetings.

The total number of comments received during both scoping comment periods and the method of submittal is summarized in **Table 4**. A summary of the comments by commenter affiliation is provided in **Table 5**.

Table 4. Comments and Method of Submittal

Method of Submittal	Phase 1: Number of Comments	Phase 2: Number of Comments
Submitted at Public Meeting	51	n/a
Hard Copy Mailed	108	8
Submitted via Website	5,178	1,322
Subtotal	**5,337**	**1,330**
TOTAL	**6,667**	

Table 5. Commenter Affiliation

Affiliation	Phase 1: Number of Comments	Phase 2: Number of Comments
Member of the Public (or no affiliation)	5,274	1,314
Tribe or Pueblo	7	0
Federal Agency	7	1
State or Local Agency	7	2
Elected Official	1	2
Aviation Group or Private Pilot	23	0
Airport	1	1
Non-Government Organization	17	10
Subtotal	**5,337**	**1,330**
TOTAL	**6,667**	

3.1 Comment Review Methodology

All comments received during the published scoping comment periods were reviewed by DAF and evaluated by a two-tiered approach:

- **Tier 1**: Categorize comments as substantive or non-substantive.
  - *Non-substantive comments* are non-specific; express a conclusion, an opinion, agree, or disagree with the proposal; vote for or against the proposal itself, or some aspect of it; state a position for or against a particular alternative; or otherwise state a personal preference or opinion.
    - Non-substantive comments are included in the Administrative Record but were not evaluated further in the development of the Draft EIS.
  - *Substantive* comments are those comments that provide additional alternatives to be considered in the Draft EIS, offer specific information or analysis(es) relevant to the Proposed Action or Alternatives, or expressed a specific concern that should be considered in the Draft EIS or used to determine the scope of the EIS in accordance with 40 CFR 1501.9(d) and 1502.17.
- **Tier 2**: Substantive comments were considered collectively and individually and categorized by relevant topic. These comments are summarized in this document. A single substantive comment can be categorized by more than one comment category.

3.2 Scoping Comment Tally

Table 6 provides a breakdown of the comments received during the designated scoping comment periods. A duplicate comment is the same comment provided by the same commenter via multiple submittal methods (i.e., hard copy sent through U.S. Post and electronic copy sent through website). Several types of form comments were received during the scoping process, these constituted the majority of the comments received. A form comment is the same comment provided by multiple individuals. These comments were counted individually for the comment tally but categorized collectively as one substantive comment for each type of form.

Three petitions in opposition to the project were received during the Phase 1 scoping comment period. These petitions included a general comment/statement and signatures from members of the public. Two of the petitions also allowed signature parties to insert a comment with their signature. These comments were generally in line with the comment/statement on the petition and were not categorized individually. During the Phase 2 scoping comment period two of the same petitions were provided with additional signatures/comments. Petitions are summarized in **Table 7**.

Table 6. Scoping Comment Tally

Type of Comment	Phase 1: Number	Phase 2: Number
Substantive - Unique	1,338	341
Substantive - Form Comment	2,915	419
Non-Substantive	1,051	562
Duplicates	33	8
Subtotal	**5,337**	**1,330**
TOTAL	**6,667**	

Table 7. Petitions

Petition	Phase 1: Number of signatures	Phase 2: Number of signatures
Eagle Roost Airpark	148	--
Peaceful Gila Skies	145	89
Peaceful Chiracahua Skies	832	495
Subtotal	**1,125**	**584**
TOTAL	**1,709**	

3.3 Scoping Comments

Comments and stakeholder input received within the designated scoping comment periods were considered during the development of the alternatives and the analysis presented in the Draft EIS. Section 4.0 of the EIS details submitted alternatives by the public or stakeholders in accordance with 40 CFR 1502.10(7). Those comments aren't repeated in this appendix to avoid repetition.

Since a large number of substantive scoping comments were submitted, the DAF elected to summarize the comments. All comments received on this EIS are included in the Administrative Record regardless of when they were received and, regardless of their substantive or non-substantive nature. **Table 8** provides a summary of the substantive comments or issues received during scoping and how the DAF addressed those comments in the EIS. This table is meant to provide a summary of the substantive comments and not individual comments verbatim. The table is sorted into the following comment categories:

- Scoping Process, NEPA Process, and Meeting Locations
- Lack of Information Provided
- Purpose and Need
- Region of Influence
- Enforcement of Pilot Violations
- Air Quality and Climate Change Concerns
- Cultural Resources Concerns
- Environmental Justice Concerns
- Land Use Concerns
- Socioeconomic Concerns
- General Aviation Concerns
- General Aviation Concerns – Bagdad and Gladden MOAs
- General Aviation Concerns – Jackal, Outlaw, Morenci, Reserve MOAs
- General Aviation Concerns – Tombstone MOA
- Public and Private Airport Concerns
- Noise and Sonic Boom Concerns
- Biological Resources Concerns
- Chaff and Flare Concerns, Wildfire Risk
- Aircraft Safety Concerns
- Cumulative Impacts

Peer reviewed or otherwise valid reference material or sources of information provided by the public and stakeholders during the scoping comment period are provided in **Table 9**. These references were reviewed by the resource authors and used as applicable. Several comments provided links, copies, or excerpts of news articles related to the Holloman AFB EIS, fires, aircraft mishaps, other past military activities, etc. Newspaper or Wikipedia articles were not evaluated for use as reference material in the EIS.

Table 8. Summary of Scoping Comments and DAF Responses

Summarized Comments by Category	Addressed in EIS	If Yes, Location in EIS, If No, Rationale

Scoping Process, NEPA Process, and Meeting Locations

Scoping Process, NEPA Process, and Meeting Locations		
Meeting location requests –Ft Huachuca, AZ; Portal, AZ; Bisbee, AZ; and Douglas, AZ; Arivaca, AZ; Rodeo, NM; Silver City, NM; Socorro, NM; Cliff, NM; Lordsburg, NM; Gila, NM; Grant and Hidalgo County. Complaints that Animas meeting is outside the MOA	n/a	The scoping meeting locations provided sufficient geographic coverage for the areas most likely to be impacted by the proposal. Meeting location requests received during the scoping comment period were taken into consideration when determining the locations for Public Hearings.
Would be helpful to have an interactive map with a zoom in function to view the specific neighborhoods affected; include more details in the maps that you're sending out so that the average person could have a better idea as to where the boundaries are located.	n/a	This feature was made available on the project website during scoping Phase 1.
Requests for extension on comment deadline	n/a	The DAF extended the scoping period to accommodate the request. Comments were received through June 3, 2022.
Notification of meetings should have been made through local libraries and post offices.	n/a	The scoping meetings were advertised in ten newspapers throughout Arizona and New Mexico, press releases issued by all three installations, social media pages for all three installations, and on the project's website. The Draft EIS was made available at local libraries. The cover sheet for Draft EIS to the libraries included a list of the Public Hearing locations.
Scoping meeting format – dislike not having a formal presentation or ability to provide verbal comments in an open forum	n/a	The Public Hearings held during the Draft EIS comment period include a presentation of the Draft EIS findings and the ability for the public to provide verbal comments.
Requests for virtual meetings that allow for interaction with Air Force representatives and public participants	n/a	Virtual Public Hearings will be held during the Draft EIS comment period.
Questions/statements that meetings were not held on Tribal lands (specifically White Mountain or San Carlos Apache) which are often areas with limited internet access	n/a	The DAF has consulted with government leaders of potentially affected Tribes in accordance with Section 106 of the National Historic Preservation Act. In-person meetings with Tribal leaders were held at their request.

		All tribal members were invited to attend public scoping meetings as part of the NEPA process.
Requests for ability to provide email address so that EIS can be provided electronically	n/a	The EIS and all related project materials are available on the publicly accessible project website. Public and other stakeholders were added to a mailing list to receive notification when the Draft EIS is available.
Qualified experts must be involved in the EIS; requests to use private entities to prepare EIS.	Yes	Section 6.0 provides the List of Preparers.
Questions about where to find information on decision or outcome of action	n/a	The EIS and all related project materials are available on the publicly accessible project website. The DAF will publish a Record of Decision in the Federal Register and a notice will be published in local newspapers. A copy of the decision will also be made available on the website.
Increase communication with local general aviation pilots	n/a	As part of the scoping process, the DAF provided letters to all public and private airports potentially affected from the airspace action with details on the proposed action, invitations to the scoping meetings, requests for comments, and links to the project website for additional information. In addition to airports, letters were also provided to national and local pilot organizations to include National Business Aviation Association, Airlines for America, Aircraft Owners and Pilots Association, New Mexico Pilots Association, and Arizona Pilots Association. Also, FAA will solicit circularization comments with aviation stakeholders as part of the aeronautical process which occurs concurrently with the NEPA process.
Coordination with public and private airports beneath airspace per JO 7400.2L – if MOA floor extends below 1,200 feet AGL over charted private airport, coordination should be effected with airport operator	n/a	As part of the scoping process, the DAF provided letters to all public and private airports potentially affected from the airspace action with details on the proposed action, invitations to the scoping meetings, requests for comments, and links to the project website for additional information. In addition, FAA will solicit circularization comments with aviation stakeholders as part of the aeronautical process.
Questions/general comments on status or presumed lack of consultation with Tribes and federal and state land management agencies to include USFS, NPS, BLM, USFWS, AZ Game and Fish, NM State Parks Dept, NM Game and Fish, New Mexico and Arizona State Land Offices	Yes	Regulatory and Government to Government Consultation is summarized in Section 1.5. Public and Agency Coordination is provided in EIS Appendix D (this appendix).

Lack of Information Provided

Lack of Information Provided		
Comments implying the Draft EIS is inadequate or lacking information. Misperception that the NOI, website information, scoping materials constitute the Draft EIS	n/a	DAF NEPA requirements for public involvement are set forth in 32 CFR Part 989; specifically, NEPA requires a process called "scoping" to solicit input from the public and interested agencies. To effectively define the full range of issues and alternatives to be evaluated in the EIS, the DAF solicited comments from interested local, state and federal elected officials and agencies, Tribes, as well as interested members of the public and others. The Notice of Intent, website content, and materials presented during scoping are not required to and do not constitute as extensive a document as a Draft EIS would be.
Information is difficult to understand for civilian/non-aviation personnel. Terminology is unfamiliar, highly technical nature of information	Yes	A Glossary has been included as Appendix B in the Draft EIS to provide definitions of technical information used in the EIS.
Better maps should be provided during comment periods and meetings, MOA boundaries in relation to towns/communities are vague and confusing	Yes	An interactive map of the airspace was made available on the project website during scoping and remains in place for the Draft EIS comment period. This feature allows users to enter a specific address or location to direct the zoom of the airspace map. This makes it easier for the public to identify the MOA(s) of concern for their specific location. Detailed maps of the existing airspace and the proposed changes to the airspace are provided in Section 2.1.2, *Horizontal and Vertical Dimensions.*
Comments stating the alternatives were not defined	Yes	The preliminary alternatives were presented during scoping via the website and in materials at the scoping meetings. Section 2.2, Alternatives Carried Forward for Analysis, presents the alternatives addressed in the EIS which are the same as those presented during scoping.
The NOI lacks significant information in order to provide comments – number and altitude of proposed operations/sorties, types and number of aircraft, specifics about mission activities, frequency of flights, daytime vs nighttime flying (subsonic and supersonic), how much chaff and flare, etc.	Yes	The proposed operations for the Proposed Action and alternatives are presented in detail in Section 2.2, Alternatives Carried Forward for Analysis.
Question if airspace is to be used for Taiwan Air Force or other Foreign Military Sales training, percentage of sorties from foreign military	Yes	The Proposed Action is needed to meet the training requirements of the primary fighter aircraft stationed in Arizona which includes A-10s, F-16s, and F-35s (see Section 1.4, Purpose and Need). Foreign military training is a component of the installations in Arizona and operations associated with this effort

		are included in the operation details in the EIS (see Sections 2.2.1, 2.2.2, 2.2.3, and 2.2.3).

Purpose and Need

Purpose and Need		
With the availability of other Arizona MOA training areas, better scheduling, and better planning/coordinating these changes are unnecessary	Yes	Section 1.3, specifically subsection 1.3.2, provides background information on the regional airspace challenges that drive the need for the Proposed Action. The Purpose and Need is specifically defined in Section 1.4.
Questions about why Restricted Areas can't be used	Yes	Section 1.3.2 provides information on the saturation of the Restricted Areas.
It seems to me that you need to have such changes in order to fully train for the F-35 and possibly establish the F-35 in Tucson at either Davis-Monthan and/or Tucson International Airport. I believe you can still use the Goldwater bombing range for such flights	Yes	Section 1.3.2 provides information on the saturation of the Restricted Areas. See also Section 2.3, Alternatives Considered but Eliminated for expanding use of BMGR restricted areas.
No data is provided to support the Air Force's purpose and need for the proposed action. No current and/or future needs are articulated for any of the ten Military Operations Areas (MOAs) or the aircraft stationed at any of the bases in Arizona	Yes	See Section 1.2, Existing Airspace and Operations; Section 1.3, Background; and Section 1.4, Purpose and Need. As threats evolve, so do weapons systems and aircraft capabilities. These changes require pilot training in airspace with appropriate volume, altitudes, and attributes of airspace.
As supersonic jets have been developed for decades, the county would like an explanation as why the airspace needs to be increased in size to accommodate subsonic flights that have been historically in existence?	Yes	Section 1.3, Background, provides a discussion of the evolving threats that necessitate changes to aircraft capabilities and weapons systems, which in turn drives the need for the airspace available for training.
Why aren't existing requirements satisfactory after so many years of being in place. Current and changing needs are unclear.	Yes	Section 1.3, Background, provides a discussion of the evolving threats that necessitate changes to aircraft capabilities and weapons systems, which in turn drives the need for the airspace available for training.
By excluding Barry M. Goldwater Range and the Sunny MOA, the NOI and EIS website minimize the actual amount of SUAs available to the bases and imply that only the MOAs identified in the public information will be available to meet their training needs.	Yes	Section 1.3.2, provides a discussion of the saturation of the restricted airspace above the BMGR. See also Section 2.3, Alternatives Considered but Eliminated which includes a discussion of expanding hours at BMGR East. Section 2.2, Alternatives Considered but Eliminated discusses why Sunny MOA was not proposed for optimization. This MOA is currently and will continue to be used for training.
they must justify the need for dropping flares from lower altitudes than currently authorized	Yes	Section 2.1.3, Attributes, the minimum release altitude for flares is only proposed to be lowered to align with the new lower floor proposed in some of the MOAs.

This expansion is clearly in violation of Air Force procedures: "Air Force procedures require that, whenever possible, flights be over open water, above 10,000 feet, and no closer than 15 miles from shore. Supersonic operations over land must be conducted above 30,000 feet or, when below 30,000 feet, in specially designated areas approved by Headquarters United States Air Force, Washington, D.C., and the FAA."	Yes	While the Air Force has many areas where supersonic flight has a 30,000 feet floor over land, it must have some areas at lower altitudes and already has some locations where supersonic floors are as low as 5,000 or 10,000 feet AGL. Establishing lower supersonic floors is in accordance with Air Force procedures as long as procedural approvals are obtained. The Purpose and Need is specifically defined in Section 1.4.

Region of Influence

Region of Influence		
EIS needs to analyze flight corridors leading to MOAs and impacts to land beneath	Yes	Section 3.1, Introduction
While SUA utilization data remains difficult for the public to obtain, it is apparent that, in many instances, SUA is being significantly underutilized. While we have been informed that the USAF maintains a current policy of regular reviewing under-utilized SUA, AOPA continues to advocate for SUA utilization data to be made publicly available, allowing for a public review of airspace that might be able to be returned to civil use	Yes	Existing operations in the MOAs associated with this EIS are provided in Section 1.2.2. FAA Joint Order 7400.2 governs reporting, review and analysis requirements for SUA and also includes public notice procedures. The DAF provides annual utilization data for all SUA to the FAA. Following the required review, if it is determined the SUA requires changes, the FAA Service Center coordinates with the appropriate military representative.
EIS needs to analyze region surrounding Davis-Monthan and Morris ANG Base – changes to total number of sorties, type of aircraft at the bases, day and night during which sorties depart and arrive, frequency or use of each departure and arrival flight paths.	Yes	Existing operations originating from the Arizona bases are provided in Section 1.2.2, Existing Operations. The Proposed Action will not change operations at any of the airfields, see Section 2.1, Proposed Action.
EIS should provide information about current regional and national base, range and airspace changes – DoD should initiate a continent-wide analysis of all military flights and training, whether manned or unmanned, by all branches of the military	No	The Proposed Action addressed in this EIS is the optimization of SUA to support aircrews stationed in Arizona. Airspace changes for other DoD SUA would be addressed in a site specific NEPA documents.
EIS should address impacts to each bioregion/ecosystem from all alternatives	Yes	Impacts to Natural Resources are addressed in Section 3.6.
Address impacts to Recreation and Wilderness Values	Yes	Impacts to Recreation and Land Use are addressed in Section 3.7.

Enforcement of Pilot Violations

Enforcement of Pilot Violations		
Air Force needs to address spill-outs, especially due to the supersonic nature of many operations in the area. Spill-outs are a safety issue for non-	No	The DAF manages airspace in accordance with processes and procedures detailed in DAFMAN 13-201, Airspace

participating aircraft and FAA should identify the current rate at which they occur, ensuring sufficient mitigations are enacted before this proposal moves forward. Some comments provided specific incidents of violations from current activities.		Management. Pilots must adhere to local flying requirements specific to an installation and the training airspace being used. Aircraft training within MOAs is strictly scheduled and monitored by the using agency of the MOA. In the event a military aircraft gets too close to or exits the MOA boundaries during flight maneuvers, Air Traffic Control would alert the pilot and notify FAA of this "spill out" for any control actions required to ensure this aircraft is separated from other IFR flights near that boundary. In accordance with FAA JO 7400.2, recurring spill out data is reviewed annually for MOAs. If changes to SUA are required, for this or any other reason, the FAA Service Center coordinates with the appropriate military representative.
Complaints over the reporting process and lack of appropriate Air Force response if caller cannot provide wing number, exact time of day, or GPS location	No	Complaints can be submitted to the Public Affairs Offices at each installation. To investigate these inquiries, the more information that can be provided the better since the airspace in the region is used routinely by all the DAF installations as well as transient aircraft.

Air Quality, Climate Change, Environmental Contamination Concerns

Air Quality and Climate Change Concerns		
What potentially harmful substances will be released from the jets that hasn't been discussed or alluded to yet, such as jet fuel or other emissions? My concern is of the case of someone right under the jets as they pass, what would be the air quality and exposure levels?	Yes	Section 3.5, Air Quality.
Emissions of oxides of sulfur would increase. At the very least, the F-35 can be expected to annually emit: 1.63 tons of Volatile Organic Compounds (VOCs), 1.62 tons of Carbon Monoxide, 1.30 tons of Nitrous Oxide, 13.26 tons of Sulfur Dioxide, 3.26 tons of large particulates, 3.16 tons of small particulates, 48.76 tons of Carbon Dioxide.	Yes	Section 3.5, Air Quality. This section provides the quantified emissions associated with the Proposed Action.
Increased flights also means increased fire training and fire suppression. fire retardants contain PFAS - impacts to ground water	No	Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) contamination is related to the former use of aqueous film forming foam (AFFF), a fire suppressing agent, at airfields. PFOS/PFOA is not an issue for aircraft operation (or flare usage) within airspace and does not need to be addressed in the EIS.
Military aircraft and engines also tend to be older and less efficient than commercial aircraft and produce more emissions	No	Aircraft gas turbine engines burn fuel more efficiently than most mobile sources. Because most fuel is consumed at higher power settings and most operational time is spent at cruise, greater than 99 percent of fuel undergoes complete combustion and is

		efficiently converted to carbon dioxide (CO2) and water. Hazardous Air Pollutant (HAP) emissions are greatest under idle conditions when the engines are operating in a less efficient cycle (FAA 2009). This condition would occur in the airfield environment and not within airspace; therefore, HAPs are not addressed in this EIS.
The current level and scope of activities of training and flight time are excessive and must be reduced. The Air Force consumes huge quantities of jet fuel and emits huge quantities of greenhouse gas. Those GHG emissions are totally inconsistent with President Biden pledge to reduce U.S. emission by 52% by 2030. The Air Force must reduce flights and damaging training activities (like bombing and other military tactics).	Yes	The Purpose and Need is addressed in Section 1.4. Section 3.5, Air Quality, addresses GHG emissions.
Contrails and cirrus clouds: condensation trails (contrails), thought to have a global warming effect, though less significant than CO2 emissions. Contrails are uncommon from lower altitude aircraft.	Yes	The climate impact of air traffic is to a large degree caused by changes in cirrus cloudiness resulting from the formation of contrails. This impact is discussed in Section 3.5, GHGs.
Particulates: Compared with other emissions, sulfate and soot particles have a smaller direct effect: sulfate particles have a cooling effect and reflect radiation, while soot has a warming effect and absorbs heat, while the clouds' properties and formation are influenced by particles. Contrails and cirrus clouds evolving from particles may have a greater radiative forcing effect than CO2 emissions. As soot particles are large enough to serve as condensation nuclei, they are thought to cause the most contrail formation.	Yes	Particulate matter is addressed under Section 3.5 Air Quality. Contrails are discussed under greenhouse gases.
Our small circular valley (Rodeo/Portal) is framed by the Chiricahua, Peloncillo, Grey, and Black mountain ranges; because of its formation this small mountain enclosed valley traps air (jet fuel pollutants) while sound bounces and echos. This not only affects our families, but domestic animals as well (dogs, cats etc...) farm animals (cattle, goats, sheeps, chickens etc...) organic vegetable gardening, as well as our drinking water, (well water) ponds, water sources throughout; completely hindering food production.	Yes	Section 3.5, Air Quality provides quantitative analysis on air emissions.

Cultural Resources Concerns

Cultural Resources Concerns		
Proposal (increased noise, sonic booms, release of chaff and flares) will have negative impacts to Tribes, indigenous peoples, and rural communities. These activities should not be allowed over Tribal land.	Yes	Section 1.5, Regulatory and Government to Government Consultation. Section 3.10, Cultural Resources.

Draft EIS needs to document consultation and indicate any concerns or recommendations that were identified and how the Air Force plans to address these issues. Identify any culturally significant dates or times that may be important for noise avoidance.	Yes	Section 1.5, Regulatory and Government to Government Consultation. Section 3.10.5, Mitigations. Traditional Cultural Properties are discussed by MOA in Section 3.10 through ongoing consultation with Tribes.
EIS must evaluate impacts of extreme noise and pressure wave of supersonic flights on sacred sites and Native lands.	Yes	Section 3.4, Acoustic Environment; Section 3.10, Cultural Resources
Historically significant places have been added to the National Register of Historic Places including Boyce Thompson Southwest Arboretum (Est 1927) in 1976, Queen Creek Bridge (Built in 1921) in 1988, Devil's Canyon Bridge (Built in 1921) in 1988, McPherson Magma Hotel. (Built in 1912) in 1994, and the Chi'chil Bildagoteel (Oak Flats) Historic District Traditional Cultural Property in 2016	Yes	Section 3.10, Cultural Resources and Appendix M. An inventory of all NRHP listed properties is provided in Appendix M and was considered in the analysis.
The proposed changes to military training in the Jackal and Outlaw MOAs over White Mountain Apache and San Carlos Apache lands will also affect numerous historic properties listed on, eligible for listing on, or formally declared eligible for listing on the U.S. National Register of Historic Places. These properties, each of which requires detailed assessments of visual, auditory, vibratory, associative, affective-emotional-health, and other impacts and effects on the elements of setting, location, design, and workmanship that make these places nationally significant, include the following: -->Mt. Graham, Oak Flat, and many other places holy to Western and Chiricahua Apaches, including at least two dozen mountain landforms having exceptional importance in Apache and regional history and culture. -->Many additional places used by Apache people for cultural practices specifically because they are quiet and free from all vestiges of violence (including the Black River and Salt River canyons and tributaries). -->The Fort Apache and Kinishba Pueblo National Historic Landmarks (and other NHLs). -->Large numbers of highly sensitive cliff dwellings and other still-standing masonry and adobe structures dating to period from about 1200 to 1800.	Yes	Section 3.10, Cultural Resources and Appendix M. An inventory of all NRHP listed properties is provided in Appendix M and was considered in the analysis. The DAF is consulting with all Tribes to determine Traditional Cultural Properties or sites with significance to determine appropriate mitigation, if necessary. Tribal Correspondence is provided in Draft EIS Appendix N.
These western desert states' wilderness areas contain pre-historical info on geology, climate, migrations, ancient gathering places, water sources. Reverberations and shock waves from detonations and impacts through the ground destroy remaining visible and buried archaeological sites and are severely harmful to animal life in above- and underground, day/night, seasonal environmental cycles of the SW states.	Yes	Section 3.10, Cultural Resources and Appendix M. An inventory of all NRHP listed properties is provided in Appendix M and was considered in the analysis.

The Phelps Dodge General Office Building NHL and Double Adobe NHL are within Tombstone C MOA, and the Fort Apache/TR Roosevelt School, Kinishba Ruins, and Point of Pines NHLs are within Jackal MOA. In accordance with Section 106 of the National Historic Preservation Act, NPS can provide expertise in management of NHLs, and anticipates analysis will be needed for potential for impacts to these or other nearby NHLs resulting from the proposed adjustment of MOAs that will consider areas for lower altitude flying in addition to lower levels for chaff/flare and supersonic authorizations.	Yes	Section 3.10, Cultural Resources and Appendix M. An inventory of all NRHP listed properties is provided in Appendix M and was considered in the analysis.

Environmental Justice Concerns

Environmental Justice Concerns		
Comments stating the EIS needs to evaluate the environmental justice impacts of this proposal on communities of color and low-income communities, including the San Carlos and White Mountain Apache Tribes, Tohono O'odham Nation, and Pascua Yaqui Tribe.	Yes	Impacts to minority and low-income populations are discussed in Section 3.9. Impacts to Tribal land and communities are discussed in Section 3.10.
Request for identification of minority and low-income census block groups that would experience increased noise impacts and indicate whether the increases would result in a disproportionate adverse impact.	Yes	The region of influence for environmental justice considerations includes all counties under the MOAs. The demographic analysis of minority and low-income populations is conducted at the county level since all communities beneath the MOAs would have the same potential for exposure to aircraft overflights and the populations within each county would be similarly affected. Section 3.9 provides the Environmental Justice analysis.
Draft EIS should document the specific outreach that was conducted for low-income and minority populations, including efforts to address non-English speaking residents	Yes	Planned locations for in-person scoping meetings considered the total population level as well as the percent minority and impoverished. Given the timeframe for scoping meetings (during the COVID-19 pandemic) the total number of in-person meetings were limited due to safety concerns and supplemented with a Virtual Presentation available on the website. The in-person scoping meetings targeted more rural, less populated, minority and low-income areas that were more likely to lack internet access. Pertinent scoping information and materials were translated into Spanish, to include: • Newspaper notices were run in both English and Spanish in all newspapers. • A Spanish translator was available at all scoping meetings to assist Spanish-speaking individuals.

Consider utilizing EPA tool EJ Screen (https://ejscreen.epa.gov/mapper/)	Yes	Multiple resource sections in the Draft EIS present the specific attributes displayed on the EJ Screen tool to include Section 3.5, Air Quality, Section 3.8 Socioeconomics, and Section 3.9 Environmental Justice. The U.S. Census data was used to present the specific county-level data for socioeconomics, minority populations, low-income populations, and children.

Land Use Concerns

Land Use Concerns		
General statements that overflights, supersonic flights, release of chaff and flares, military training, should not occur over or conflict with wilderness areas	Yes	In accordance with 36 CFR §261.18 National Forest Wilderness, the following are prohibited in a National Forest Wilderness: (a) Possessing or using a motor vehicle, motorboat or motorized equipment except as authorized by Federal Law or regulation, (b) Possessing or using a hang glider or bicycle, (c) Landing of aircraft, or dropping or picking up of any material, supplies, or person by means of aircraft, including a helicopter. Notable prohibitions of certain uses as defined in the Wilderness Act, Public Law 88-577 (16 USC 1131-1136), Section 4, include the following: ….(c) Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area. The prohibitions in this regulation are aimed at transportation (i.e., using mechanical means to access Wilderness Areas or to airdrop supplies or persons) for commercial or private purposes. The DAF does not propose to access any land areas, to include Wilderness Areas, as part of the Proposed Action. Dropping chaff or flares is a governmental activity for a government purpose (similar to aerial firefighting, patrolling, or rescue). The intent of the statute is focused on private/commercial activities

		(see Section 4(c) of the Wilderness Act) and these prohibitions do not apply to chaff and flares. The enabling acts for wilderness areas in Arizona, Arizona Desert Wilderness Act of 1990, specifically sets low level military training as a value that does not affect wilderness designation: "i). MILITARY ACTIVITIES. – Nothing in this title shall preclude low level overflights of military aircraft, the designation of new units of special airspace, or the use or establishment of military flight training routes over wilderness areas designated by this title." Impacts associated with wilderness areas is addressed in Section 3.7, Land Management and Recreation
Proposed changes are commensurate with taking private property without compensation which is prohibited by the U.S. Constitution	No	No land-based activities or land acquisition is proposed and there is no frequent overflight at 500 feet or lower of the same ground point that produces 65 dB DNL or higher noise proposed over private property.
Ejecting chaff and flares (and their packaging/housings) over national forest land violates Code of Federal Regulations CFR 261.11b. [36 CFR 261.11b – Parks, Forests, and Public Property; Prohibitions; Sanitation]	No	36 CFR 261.11(b) prohibits "Possessing or leaving refuse, debris, or litter in an exposed or unsanitary condition." Debris from chaff and flare use does not accumulate in quantities that make it objectionable or even noticeable below large airspace areas such as those associated with the Proposed Action. The debris is only visible in open contexts where vegetation is sparse, along a road or pathway, or in cleared and maintained areas. Even in these open areas, impacts from chaff and flare debris are insignificant when compared to accumulated roadside trash or other more common visual intrusions, such as those intended with the prohibitions under 36 CFR 261.11b.
Cave Creek Canyon enjoys legal protection under the Cave Creek Canyon Protection Act of 1993 against mining due to the extraordinary level of biodiversity in the area. The same logic should apply to the known deleterious effects of noise on breeding bird populations	No	Cave Creek Canyon Protection Act of 1993, Public Law 103-56, states specifically, "Withdrawal – subject to valid existing rights, after the date of enactment of this Act lands within the Cave Creek Canyon Drainage are withdrawn from entry, location, or patent under the general mining laws, the operation of the mineral and geothermal leasing laws and the mineral material disposal laws." This law is not relevant or applicable to the Proposed Action to optimize SUA.
Include Continental Divide Trail and one-half mile corridor on either side of the trail on all future planning figures/materials for this project. Evaluate the impact that an increase in visible aircraft, ancillary activities such as flare and chaff, and auditory pollution will have not only on the primitive	Yes	Continental Divide Trail is shown on Land Use Figures 3.7-1 and 3.7-2. A small portion of the trail is in an area with a "reportable" increase in noise, however, the noise exposure would not exceed 65 db DNL indicating no impacts to land use

experience for which the trail is intended, but also how the introduction of these conditions will impact wildlife, habitat, and even cultural resources		or recreation. The potential impact to the trail is discussed in detail in Section 3.7.3.2.
The Continental Divide National Scenic Trail Comprehensive Management Plan was approved by the U.S. Forest Service and set forth as policy in 2009. This overarching policy direction serves to implement Congress's direction in the National Trails System Act, and is an essential tool for guiding decisions regarding Forest Plan direction for the CDNST. The Comprehensive Plan also incorporates FSM 2353.42 and 2353.44b.	Yes	This plan is included in the past, present, and reasonably foreseeable projects list in Appendix G and evaluated in cumulative impacts where appropriate.
Cosmic Campground International Dark Sky Sanctuary (CCIDSS) is the first International Dark Sky Sanctuary located on National Forest System lands and also in North America. It is also one of only 14 certified IDA Sanctuaries in the world. International Dark Sky Sanctuaries are lands possessing an exceptional or distinguished quality of starry nights. For more information on dark skies, light pollution, or the International Dark Sky Association. https://www.darksky.org/	No	Section 3.7, Land Management and Recreation provides detailed land use information for all areas expected to experience a "reportable" increase in noise. There are no anticipated land use impacts associated with the Reserve MOA, which overlies this area.
EIS should analyze impacts to and consult with federal land agencies	Yes	Section 1.5, Regulatory and Government to Government Consultation. Section 1.6, Public and Agency Involvement Section 1.7, Cooperating Agencies Section 3.7, Land Management Appendix D, Public Involvement
Several comments provided specific federal and state locations throughout Arizona and New Mexico that should be evaluated for impacts (i.e., wilderness areas, recreation areas, forests, mountain ranges, etc.)	Yes	Section 3.7, Land Management and Recreation

Socioeconomic Concerns

Socioeconomic Concerns		
General statements that the proposal will impact property values, local economies, ranching/livestock operations, and tourism (ecotourism, birding, hiking, etc.)	Yes	The potential economic impacts of the proposed action are discussed in Section 3.8.
MOA changes will reduce property values, impact the rural residential community in violation of Maricopa County Zoning Ordinance stated goals: "to promote the public health, peace, safety, comfort, convenience and general welfare of the citizens…… to protect the character and the stability of residential areas…..to secure safety from fire and other dangers…."	Yes	The potential economic impacts of the proposed action are discussed in Section 3.8. The FAA has the exclusive authority to regulate aviation safety and the efficient use of the airspace by aircraft. Attempts by state and local governments to regulate in those fields are preempted. Outside those fields, the States are generally free to regulate—even by enacting laws that are aimed at or affect aviation—as long as their laws do not conflict with FAA regulations or relate to the prices, routes, or services of commercial air carriers.

Requests for analysis on impacts to specific local businesses; specifically analyze how the action alternatives will reduce the recreational qualities that currently exist in this area, as well as the reduced economic value that the loss of recreational visits would have if this area sees increased fighter jet training. Negative impacts to significant revenue associated with birdwatching in Chiricahua Mountains. Grant and Catron Counties, NM, local economies rely on outdoor tourism. Non-resident elk hunters alone bring $130,500.00 per year into New Mexico's coffers from license revenues alone in the districts comprising the Gila National Forest. That Is independent of dollars spent within the county associated with the trip. Birders also throng to National Forest and associated lands in the Gila Valley where over 200 species aggregate. Research strongly suggests alterations in animal physiology and behavior. Just enough to send elk hunters elsewhere in New Mexico and birders to Southeast Arizona to view birds without the altered bird behavior and the dampened experience of acute noise on humans themselves. According to the Continental Divide Trail Coalition, "Gateway Communities are towns that recognize the unique economic and cultural value that the Continental Divide Trail brings. They make services accesible to hikers, educate local residents, and advocate for continued access to public lands. Committees comprise volunteers, business owners, public officials, and land management partners." This proposal conflicts with the state of New Mexico's major push to emphasize outdoor recreation as an important tool for diversifying the economy, including areas within this proposal.	Yes	Section 3.8, Socioeconomics provides an assessment of the potential economic impacts of the proposed action. Section 3.7, Land Management and Recreation provides an assessment of impacts to recreational lands and experiences.
The taxpaying citizens of Eagle Roost protest this change of MOA working altitude. This amounts to a taking of real estate,(an unconstitutional action) a huge increase in annoyance, and a severe loss of value of our homes, as private general aviation cannot operate safely at 500 above grade level in this area surrounded by mountains. Sales of our homes would be impossible, and all would lose life savings investments. All value of our investments in 150 hangar homes.. gone. Residents would have no choice except a 5th amendment Taking compensation lawsuit in federal court. Our damages would total $200,000,000.00 , + legal fees	Yes	Potential economic impacts are discussed in Section 3.8. This includes effects on housing value. Potential noise impacts are discussed in Section 3.4. This includes a discussion of the relationship between noise exposure and annoyance. Also, because the homes are within a congested area of houses, under FAA's minimum safe altitude policy, 1,000 feet would be the floor over this specific congested area. This eliminates the potential takings issue and reduces the noise concern.

		Potential airspace impacts are discussed in Section 3.2 including effects to general aviation. Non-emergency flights including general aviation would have to transit the MOA via VFR or route around the MOA during the time the MOA is active. MOAs are charted airspace, but not always active. When they are inactive it reverts to Class E or G airspace. Pilots can check NOTAMs to find out when the MOA is active, or they can call on the radio to find out real time.
The expansion of activities in the Outlaw MOA is a clear deterrent to those entities that would consider starting aviation related businesses at the Superior Airport. Increased hours of MOA activity will have a negative impact on entrepreneurs considering E81 as a place to start a new business	Yes	Potential airspace impacts are discussed in Section 3.2 including effects to general aviation.
A review of the Tombstone MOA Alternatives 1-4 includes much of the Malpai Borderlands working area. A majority of this region is made up of ranches and landscapes of which the pastoral ranchers depend on for their livelihoods. Many of the ranches within the million-acre working area have been in existence for over five generations and depend on the semi-arid grassland to produce cattle as their main source of income	Yes	Potential economic impacts are discussed in Section 3.8. This includes effects to local economies. Potential noise exposure is detailed in Section 3.4. Based on the noise modeling results, the noise resulting from the proposed overflights would not exceed a level indicating a need for land use restrictions (65 DNL)
when evaluating potential economic impacts as relates to real estate and tourism, the AF should use local thresholds for noise intrusion based on population demographics and the prevalent activities of our region. For instance, in addition to unique biodiversity, the area is renowned for clear night skies - and many visitors and property owners utilize expensive telescopes for astronomy. The AF should evaluate the economic impact of maneuvers after dark, flares, and vibrations on astronomy-related tourism and research, as well as on delicate equipment used for these purposes	Yes	Potential noise exposure is detailed in Section 3.4. Based on the noise modeling results, the noise resulting from the proposed overflights would not exceed a level indicating a need for land use restrictions (65 DNL)
Many studies point to the economic benefit of living near protected public lands. Counties with significant percentages of protected public lands create jobs at a greater rate and have higher per capita incomes than counties without protected lands. Increasing low-level and supersonic military training exercises in these areas is likely to be significantly harmful to local economies, especially to areas with prime hunting and angling opportunities.	Yes	Potential economic impacts are discussed in Section 3.8. This includes effects to local economies.
High decibel, frequently-occurring noise by military aircraft is also likely to depress property values. The Air Force must complete a comprehensive analysis of the effects to local communities from the loss of tourism dollars and reduction in property values	Yes	Potential economic impacts are discussed in Section 3.8. This includes effects on housing value.

A comprehensive study of current socioeconomic and environmental justice impacts is needed at the county level as well as at the regional market/services level, many of which cross state and county lines. The health and economic disruptions caused by the Covid-19 pandemic resulted in severe hardships to rural and frontier New Mexico and Arizona communities. Therefore, only the most current data will be acceptable in a DEIS or EIS	Yes	Socioeconomic and Environmental Justice Effects by county are assessed in Sections 3.8 and 3.9.

General Aviation Concerns

General Aviation Concerns		
Lowering the MOA floors to 500 feet would destroy the safety net of below 7000 feet for civilian operations we now are entitled to	Yes	Potential airspace impacts are discussed in Section 3.2 including effects to general aviation. Non-emergency flights including general aviation would have to transit the MOA via VFR or IFR if ATC can ensure appropriate separation, or route around the MOA during the time the MOA is active. MOAs are charted airspace, but not always active. When they are inactive it reverts to Class E or G airspace. Pilots can check NOTAMs to find out when the MOA is active, or they can call on the radio to find out real time.
The wake turbulence of low-flying combat aircraft is also a danger to small private aircraft that fly at the same altitudes	Yes	Safety concerns are discussed in Section 3.3 including the effects of wake turbulence. Flying VFR through an active MOA is allowed but not recommended because of this concern and others. It is recommended in AIM 3-4-5, that pilots operating VFR should, prior to entering a MOA contact the controlling agency for traffic advisories. The AIM outlines wake turbulence separation requirements for IFR and VFR aircraft.
The proposed flight floor of 500 ft is not in agreement with the established Air Force floor of 1000 feet over neighborhoods (AICUZ program).	No	The AICUZ program is applicable to airfields, not airspace. Minimum safe altitudes defined by FAA would be adhered to in all MOAs (which avoid populated areas by 1,000 feet).
KDUG VOR-DME 17 - there would be only 450ft clearance from 5,000 AGL supersonic aircraft (approach starts at 8,700)	No	The VOR/DME RWY 17 approach would be protected by the 13,000 feet MSL and below exclusion area (similar to the existing exclusion) in the Tombstone MOA which would contain the approach and provide appropriate separation for every segment of the approach. FAAO7110.65 9-3-2.
KSAP RNAV GPS 12 - there would be 78 ft clearance from supersonic (approach starts at 8,700 MSL)	Yes	The KSAD RNAV (GPS) Runway 12 and all other impacted approaches are discussed in Appendix H. Under the Proposed Action this procedure would be unusable when the Jackal MOA is active and would require redesign.

KCFT RNAV GPS-A - there would be a 298 ft clearance from supersonic (approach starts at 8,500 MSL)	No	There are no proposed changes to the airspace dimensions in the Morenci MOA. Instrument procedures into CFT would be executed in the same manner as they currently are when the MOA is active. Additionally, supersonic flight only occurs for a short duration during a sortie.
Lowering the altitude of operations to the levels proposed in the MOAs over NFS lands creates a grave safety concern to the Forest Service whereby pilots may cross areas where aerial fire operations are occurring	Yes	Potential airspace impacts are discussed in Section 3.2 and safety is discussed in Section 3.3, emergency flights including aerial firefighting activities are given priority in airspace. In the event there is a fire, military training would not occur within the same airspace. Additionally, Firefighting terminal flight restrictions may also be established to create a buffer zone of safety for ground and air crews.
Most general aviation pilots treat MOAs as restricted airspace, regardless of activation status, even though they are legally permitted to operate within them. This has a significant deterrent effect on these pilots and results in significant reroutes, additional flight time, and CO2 emissions. These impacts need to be given significant weight when considering large-scale SUA changes like this one	Yes	Potential airspace impacts are discussed in Section 3.2, including effects to transit times for general aviation. The FAA's Aeronautical Information Manual (AIM) 3-4-5 provides guidelines for VFR pilots to ensure safety of all aircraft while transitioning through an active MOA.
GPS interference activity occurs frequently in this area. With the proposed changes to SUA dimensions and utilization, the USAF must publicly document how GPS interference activity might also change. GPS interference has a safety and efficiency impact on civil aviation, in many cases this impact is experienced well beyond the SUA boundaries. What impact is expected on general aviation should be disclosed, as well as what mitigations are in place.	No	GPS.gov offers links to check the operational status of GPS WAAS and look up NOTAMs about known GPS disruptions. Additionally, options exist to report aviation specific GPS service outages or anomaly. If pilots encounter an interruption of GPS navigation which affects flight safety, or have flight control issues, pilots can use the phrase "Stop buzzer" over that ATC frequency. A call for "Stop buzzer" would initiate the process to interrupt the testing and restore navigation signal reception. FAAO 7110.65 5-1-3.
Supersonic flight below 18,000 feet is a flight safety issue for both civil and military aircraft. The Proposed Action needs to adopt a global approach to safety between all civil / military airborne interaction that could occur currently and under the alternatives presented. The safety impact to other airspace users is unavoidable when introducing high-speed aircraft down to 500 feet AGL and introducing supersonic flight below 18,000 feet MSL.	Yes	Potential airspace impacts are discussed in Section 3.2. Supersonic flight would take place within the confines of SUA to reduce the potential of an incident. Additionally, supersonic flight only takes place during short durations of each sortie not the entire time. Supersonic flight operations are currently authorized below 18,000 feet MSL in some of the existing SUA. VFR aircraft should contact FSS or the controlling agency of the SUA for traffic advisories to see and avoid any potential traffic conflicts. AIM 3-4-5.
Private and business general aviation will be compressed into fewer and smaller airways with an adverse impact on safety and mobility	Yes	Potential airspace impacts and impacts to general aviation are discussed in Section 3.2. and Appendix H. Air Traffic Service

		routes will remain the same with no change to route length and/or width.

General Aviation Concerns – Bagdad, Gladden MOAs

General Aviation Concerns – Bagdad, Gladden MOAs		
There are nearly 20 airports in or near the Gladden MOA that have considerable aviation flying activity within and through the Gladden and Bagdad MOAs. A 500' AGL floor would greatly increase the risk of an in-air collision between small general aviation aircraft and military aircraft	Yes	Potential airspace impacts discussed in Section 3.2 Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures and urges pilots operating under VFR to exercise extreme caution reduce potential of a safety incident.
There is also a lot of private aircraft traffic from multiple airparks in Salome and Wickenburg. All the traffic flies through the Gladden MOA and would be negatively impacted by a 500' AGL floor. Also, there is not any way these private aircraft could avoid impacting a supersonic fighter flying below 5,000' AGL.	Yes	Potential airspace impacts discussed in Section 3.2 Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides pre-MOA entry procedures to increase situational awareness and urges pilots operating under VFR to exercise extreme caution reduce potential of a safety incident.
There are multiple existing campgrounds and registered airports that border or are within the Gladden, Bagdad, Turtle and Quail MOAs. General aviation aircraft regularly fly through the MOA areas below the existing floor, transiting to Alamo Lake/Wayside airstrip, Lake Havasu, Kingman, Las Vegas and other destinations.	Yes	Potential airspace impacts discussed in Section 3.2 Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides pre-MOA entry procedures to increase situational awareness and urges pilots operating under VFR to exercise extreme caution reduce potential of a safety incident.
Embry Riddle Aeronautical University (Prescott AZ) conducts extensive student flight training operations for 800 students from the Prescott Airport. In 2021, for example, we had over 200,000 operations ranking us as the busiest airport in the United States for locally assigned aircraft. The current MOA structure is deconflicted with our practice and training areas for student activities and published at the Arizona Flight Training Workgroup web page (https://aftw.org/arizona-practice-areas/). It would compromise flight safety to extend the MOA into these practice areas which serve the needs of flight students. Given our policy is to not fly through MOAs at any time it would further compromise our safety by limiting the total area we use to disperse our flights.	Yes	Potential airspace impacts to GA aircraft discussed in Section 3.2 and Appendix H.
A second issue is that the net effect of lowering both floors would effectively cut off all safe direct routes between Prescott and Wickenburg, Bagdad, Lake Havasu City, Blythe Airports and all Southern California area airports. In the current structure student pilots can safely plan routes under the MOAs to meet FAA mandated cross country requirements.	Yes	Potential airspace impacts to GA aircraft discussed in Section 3.2. and includes an analysis of the effect on transit times for the most common origin-destination airport pairings. ATS routes near these MOAs are not impacted with the proposal. Additionally, federal regulations allow VFR aircraft to enter an

		active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under VFR to exercise extreme caution to reduce potential of a safety incident.

General Aviation Concerns – Jackal, Outlaw, Morenci, Reserve MOAs

General Aviation Concerns – Jackal, Outlaw, Morenci, Reserve MOAs		
Parts of the Outlaw MOA are in the established flight paths for incoming flights into Phoenix Sky Harbor and Phoenix Mesa Airports. How will these be affected?	Yes	Potential airspace impacts are discussed in Section 3.2. This section also includes a comparison of the most common origin-destination pairings based on available flight plans and radar track data provided by the FAA.
Radar coverage north and west of Silver City is virtually non-existent below about 8,000' MSL and only spotty at best between 8k' and 10k' due to the mountainous terrain. Smaller aircraft often remain at lower altitudes, especially while traversing north and northwest. While see-and-avoid applies to VFR in these areas, a fast-mover is hard to spot when down in the weeds and even an AESA radar can't see an aircraft coming through the mountain passes until the traffic is out in the open.	Yes	Potential airspace impacts are discussed in Section 3.2. Military operations would take place within the confines of SUA to reduce the potential of an incident. Additionally, there are no proposed changes to the vertical or horizontal dimensions of the Morenci MOA. The proposed change to the Morenci MOA is an additional hour of published time. Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under VFR to exercise extreme caution to reduce potential of a safety incident.
The Fire Season on the Gila Wilderness and the use of aerial survey, transport and fire control efforts are extremely dangerous of themselves. Adding low altitude flyovers by military training exercises will add an unacceptable level of danger.	Yes	Potential airspace impacts are discussed in Section 3.2 and safety is discussed in Section 3.3. Emergency flights including aerial firefighting activities are given priority in airspace. In the event there is a fire, military training would not occur within the same airspace. Additionally, Firefighting terminal flight restrictions may be established to create a buffer zone of safety for ground and air crews. The proposed action and alternatives would not significantly add operations to the Reserve or Morenci MOAs or change the subsonic floors or change flare release minimum altitudes.
The topography beneath the Outlaw MOA is extremely rugged and the 500-ft. AGL floor for subsonic flight is below the elevation that PVMC regularly conducts topographic surveys using aerial drones operated by licensed drone pilots. These surveys are conducted multiple times a week at elevations up to 650-ft. AGL, extending 150 feet into the AGL floor for	Yes	Potential airspace impacts are discussed in Section 3.2. Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under

subsonic flight. Furthermore, PHI Air Medical operates an air ambulance service from a base at PVM and regularly responds to calls throughout the area on very short notice.		VFR to exercise extreme caution to reduce potential of a safety incident. Air ambulance flights identifying themselves as such, receive air traffic control priority handling in accordance with FAA JO 7110.65
Lowering the floor from the current OUTLAW MOA above ASARCO lands from 8,000' MSL or 3000' AGL, whichever is higher (Alternative 1-No Action) to 500 feet AGL (Alternatives 2,3,4) will pose significant safety issues to personnel on the ground and air, and greatly increase the risk of property damage. Mine topography changes constantly as open pit excavation advances and artificial mine rock dumps increase in elevation. The current ceiling per part FAA Part 107 is 400' AGL. This will provide 100' of vertical separation between the Proposed Action and Part FAA Part 107 regulations and has a great potential for interaction and interference between the two airspaces.	Yes	Asarco mining operations are addressed as a cumulative project (Appendix G) and discussed in Section 3.2.4. Existing visual flight rules military training routes (VRs) currently overfly this area with a 300 foot floor and deconfliction methods are prescribed in ASARCO's approved Part 107 waiver. These existing deconfliction measures would continue to work with the proposed change in airspace.
Additionally, ASARCO has filed FAA Part 107 exemption waivers to extend the ceiling from 400' AGL to 1200' AGL above the Ray Mine and Hayden operations to facilitate the shortest flight time, extend photo coverage, and maximize use of pilot time and personnel, all of which affect mine economics. The proposed action alternatives are all in conflict with filed FAA Part 107 exemption waivers and operational airspace needed above ASARCO lands.	Yes	Asarco mining operations are addressed as a cumulative project (Appendix G) and discussed in Section 3.2.4. Existing visual flight rules military training routes (VRs) currently overfly this area with a 300 foot floor and deconfliction methods are prescribed in ASARCO's approved Part 107 waiver. These existing deconfliction measures would continue to work with the proposed change in airspace.
ASARCO (Pinal and Gila Counties, AZ) owns and operates a small fleet of "Drones" Small Unmanned Aircraft Systems ("UAS") which operate under FAA Part 107 regulations. The UAS include rotary wings and a fixed wing surveying grade UAS drone equipped with PPK GPS. Additionally, ASARCO contractors and sub-contractors routinely perform UAS surveys at ASARCO facilities which also operate under FAA Part 107 regulations. Generally, the UAS operate 5 days a week, daylight hours, at the Ray and/or Hayden operations	Yes	Asarco mining operations are addressed as a cumulative project (Appendix G) and discussed in Section 3.2.4. Existing visual flight rules military training routes (VRs) currently overfly this area with a 300 foot floor and deconfliction methods are prescribed in ASARCO's approved Part 107 waiver. These existing deconfliction measures would continue to work with the proposed change in airspace.
high-speed jets flying at 500 AGL, may pose a substantial risk for Air Tankers, which regularly fly over our Reservation while fighting wildland fires. Currently, Fort Apache Helitack, Springerville Helitack, Air Attack and Single Engine Air Tanker fly in the MOAs and Fly Routes listed in the BIS. Fort Apache Helitack flies primarily in the Jackal Reserve, Outlaw and sometimes in the Morenci MOAs, which include our Reservation and the Fort Apache Indian Reservation of our sister tribe.	Yes	Potential airspace impacts are discussed in Section 3.2 and safety is discussed in Section 3.3. Emergency flights including aerial firefighting activities are given priority in airspace. In the event there is a fire, military training would not occur within the same airspace. Additionally, Firefighting terminal flight restrictions may be established to create a buffer zone of safety for ground and air crews.
There is heavy recreational aviation usage of airstrips within the Reserve MOA. Just organized events alone yield hundreds of operations each year. Many more operations are conducted by recreational pilots year-round. The	Yes	Potential airspace impacts are discussed in Section 3.2. Military operations would take place within the confines of SUA to reduce the potential of an incident. Additionally, there are no

mountainous terrain makes RADAR and radio communication next to non-existent. There is real potential for mid-air collision between high-speed, low-level military aircraft and recreational aircraft.		proposed changes to the vertical or horizontal dimensions of the Reserve MOA. The proposed change to the Reserve MOA is a window of published time versus scheduling by NOTAM. Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under VFR to exercise extreme caution to reduce potential of a safety incident.

General Aviation Concerns – Tombstone MOA

General Aviation Concerns – Tombstone MOA		
Federal regulations require an altitude of at least 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft, so the 100 foot floor would only apply over "open" areas. However, in a rural community such as Portal, where lots are generally four acres or much more, it would be difficult to differentiate between obstacle fraught and open areas. Pilots might unwittingly fly below the 1,000 foot floor required for "obstacles" such as the Research Station and Visitor Center, which are situated a few miles south of the central complex of buildings	Yes	Section 3.3 discusses safety and includes an analysis of obstructions under the proposed airspace. The obstacle evaluation criteria is in accordance with 14 CFR Part 77.17. Unless the Research Station and Visitor Center have structures that are 100 feet or higher, they would not be deemed obstacles, see Draft EIS Appendix I Airspace Obstruction Analysis. Additionally, operations will be held within the confines of the SUA. Any spill outs from the airspace are tracked and reported accordingly.
Risk to EMS services: Currently, 25-30% of our patients require air transport, and military flights soaring through canyons and operating down to 100' altitude could easily threaten helicopter transport headed to and from Portal Rescue Station or remote sites.	Yes	Potential airspace impacts are discussed in Section 3.2. Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under VFR to exercise extreme caution to reduce potential of a safety incident. Air ambulance flights identifying themselves as such, receive air traffic control priority handling in accordance with FAA JO 7110.65
There are 3 recreational airstrips in New Mexico that lie just north of the existing boundary of Tombstone MOA. One of them, NM90, has been the location for 2 previous weekend fly-ins, and is scheduled for a 3rd weekend fly in in March 2022. NM12 is a newly charted recreational airstrip also just north of the existing Tombstone boundary. Expanding that boundary to the north will cause an unacceptable mid-air collision risk.	Yes	Potential airspace impacts are discussed in Section 3.2. Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under VFR to exercise extreme caution to reduce potential of a safety incident.
Is the agency or company commissioned to do the EIS aware of private dirt airstrips for private planes? At least 4 in this valley. One each on Sulfur	Yes	Potential airspace impacts are discussed in Section 3.2. Emergency flights such as air ambulance, firefighting activities

Canyon Road, Portal Road, Chamberlains and McAfee development. Are there plans to form a rudimentary traffic control for private planes, Life Support Helicopters, USBP helicopters, and air support [tankers] for forest fires and fire suppression at any given time?		etc., are given priority in airspace, provided pilots are in communication with air traffic control. Air traffic control operational priorities for these flights are outlined in FAAJO 7110.65. In the event there is a priority transit, military training would not occur within the same airspace.

Public and Private Airport Concerns

Public and Private Airport Concerns		
Airports that underlie SUA can be adversely impacted by access limitations for IFR aircraft. The impact of these limitations can have long-term financial impacts on the airport businesses, the aircraft operators, and the surrounding communities. Aircraft flying under VFR can also be discouraged to fly to airports located under active SUA due to the unusual activity that takes place in the airspace around them. Lowering the floor altitude of the MOAs to either 100 or 500 feet AGL essentially forces VFR pilots to fly into the MOAs, and creates potential delays for IFR pilots, trying to access underlying airports.	Yes	Potential airspace impacts are discussed in Section 3.2. This section also includes a comparison of the most common origin-destination pairings within the SUA based on available flight plans and radar track data provided by the FAA.
Some of the airports where issues are likely to occur are Superior Municipal Airport (E81), San Carlos Apache Airport (P13), White River Airport (E24), Greenlee County Airport (CFT), Reserve Airport (T16), Safford Regional Airport (SAD), Flying J Ranch Airport (E37), Kearny Airport (E67), Eric Marcus Municipal Airport (P01), Sells (E78), Bagdad (E51).	Yes	Potential airspace impacts are discussed in Section 3.2 and Appendix H. Section 3.2 also includes a comparison of the most common origin-destination airport pairings within the SUA based on available flight plans and radar track data provided by the FAA. There are no proposed changes to the vertical or horizontal dimensions of the Sells MOA. The proposed changes for Sells are administrative changes to published times of use.
We believe the Air Force is lacking a thorough inventory of the current and proposed aviation activities in the airspace underlaying the existing MOA's i.e.: • Glider operations (High concentration in Outlaw) • Approach and departure procedures underlying and adjacent to Proposed Action airspace • Glider launcher and cable tethered training school operations E81 • Ability to see and be seen between extremely divergent performance and visibility platforms • Itinerate aircraft transiting unfamiliar area to circumnavigate Class B & C airspace.	Yes	Potential airspace impacts and impacts to civil traffic are discussed in Section 3.2 and Appendix H. The source data for the traffic analysis is the FAA's Performance Data Analysis and Reporting System (PDARS). The data is collected/analyzed for a defined period of date/time. This system collects data from various Air Traffic Control agencies on transponder equipped aircraft.
Concern for impacts to civil airports – specifically Gladden and Bagdad – lowering floor to 500 ft blocks any flight to the west or north of airports such as Wickenburg (E25). There are nearly 20 airports in or near Gladden	Yes	Potential airspace impacts are discussed in Section 3.2 and Appendix H. Section 3.2 also includes a comparison of the most common origin-destination airport pairings within the SUA base

MOA that have considerable aviation flying activity; traffic pattern altitudes would be inside the MOA.		on available flight plans and radar track data provided by the FAA.
many general aviation pilots and student pilots in the surrounding areas currently transition through the airspace below the Gladden and Bagdad MOAs on VFR cross country training flights. Prescott Regional Airport and Cottonwood Airport to the northwest of MOAs have highly active flight training programs, and student pilots often plan flights to airports below and to the west of the MOAs. We recommend strong coordination in this effort with EAA Chapter 952 at Cottonwood Airport, as well as Embry Riddle Aeronautical University in Prescott, to ensure that their flight training operations are not disrupted.	Yes	Potential airspace impacts are discussed in Section 3.2 and includes a comparison of the most common origin-destination pairings within the SUA based on available flight plans and radar track data provided by the FAA. Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under VFR to exercise extreme caution to reduce potential of a safety incident.
The Town of Superior Airport, E81, is located in the Outlaw MOA and as such is of concern to present and future aviation activity for both VFR and IFR air traffic. Uncontrolled VFR aircraft have been forced to remain clear of the Phoenix and Tucson Class B Airspace, the Phoenix 30 NM Mode C and ADS-B, Out Veil and the Davis Monthon Class C airspace. Additionally, the Town of Superior, is in coordination with a soaring school that intends to begin soaring training at E81. Increased hours of activity will have a negative impact on the use of E81 as a destination airport.	Yes	Potential airspace impacts are discussed in Section 3.2 and includes a comparison of the most common origin-destination airport pairings within the SUA based on available flight plans and radar track data provided by the FAA. Federal regulations allow VFR aircraft to enter an active MOA. The FAA's Aeronautical Information Manual (AIM) section 3-4-5 provides MOA entry procedures for IFR/VFR traffic to increase situational awareness. The AIM urges pilots operating under VFR to exercise extreme caution to reduce potential of a safety incident.
With potential expanded military operations along with lowered floors and raised ceilings for military operations there is the possibility of an impact to routes of arriving and departing traffic utilizing IWA from the east. IWA has checked with our Air Traffic Control Tower Manager and he did not foresee any issues with IWA's Class Delta airspace, which they manage, but was unsure if/how Phoenix's TRACON (P50) approach control could be impacted.	Yes	Potential airspace impacts are discussed in Section 3.2. The analysis includes a comparison of the most common origin-destination airport pairings within the SUA. The data is based on available flight plan information provided by the FAA. This analysis does not cover specific impacts to Phoenix TRACON operations.

Noise and Sonic Boom Concerns

Noise and Sonic Boom Concerns		
Increased noise/sonic booms/pressure waves will impact people, animals, local economy, wilderness areas, etc.; some of these comments also focus on rural, minority, and socially disadvantaged communities. Sonic booms reverberate along the mountains.	Yes	Subsonic and supersonic noise impacts are discussed in Section 3.4, Noise. Natural Resources are addressed in Section 3.6. Wilderness Areas are addressed in Section 3.7. Socioeconomics is addressed in Section 3.8. Environmental Justice is addressed in Section 3.9.
Excessive exposure to noises that are too loud, too close, or experienced for too long can cause irreversible & permanent damage to hearing"	Yes	Section 3.4, Noise. The results of the noise study indicate no potential for hearing loss.

Concern for and/or statements that EIS must analyze effects to veterans with PTSD, senior citizens, and children.	No	Section 3.4, Noise provides the results of the noise study. Other resource areas address those noise impacts on various human and environmental resources.
EIS should/must analyze the impacts of extreme noise from low-level & supersonic training on communities & wildlife, including damage to structures. The pressure wave generated by supersonic flights at 5,000 – 10,000 feet above ground level (AGL) can break glass, crack plaster, and collapse free standing walls.	Yes	Section 3.4, Noise provides an analysis on sonic booms and pressure waves. Those results are also discussed in relevant resource sections to include natural resources and cultural resources.
.Damage claims – what money has been set aside, how to submit a claim, Air Force never pays the claims, etc.	No	Damage claims for any military activity may be submitted to the appropriate office of the Staff Judge Advocate (SJA) at base level. The Public Affairs Office at base level can assist in initiating this process by providing contact details
Concerns about hearing loss, speech interference, sleep disturbance.	Yes	Section 3.4, Noise.
The noise levels being proposed are above the level at which OSHA requires hearing protection.	Yes	Section 3.4, Noise.
Vibrations can add to human and wildlife impacts. Low frequencies that may not be heard, but may cause shaking or rattling, should also be studied. In 2018, the Federal Interagency Committee on Aviation Noise (FICAN) stated the following concern: “FICAN finds that additional research needs to be conducted before a low frequency noise metric and an associated dose-response relationship can be recommended.”	No	The portion of the FICAN 2018 report concerning vibration is specific to airports, not airspace. Regardless, it states that it does not support using a Low Frequency metric without further research.
The USAF will need to provide the public accurate information which allows the tracking of effects and changes that will occur over time. At a minimum, baseline data on locations of wildlife and migratory bird paths, and the current exposure of animal populations and human communities to sudden heightened noise levels is needed in order to properly analyze the impacts (direct, indirect, and cumulative) of the proposed action.	Yes	Section 3.4, 3.5, 3.6, and 3.10 provide information on existing conditions (Affected Environment) for Noise, Air Quality, Natural Resources, and Cultural Resources.
Recommend against the use of the averaging metric DNL as the sole determinant of significance for noise impacts in the DEIS	Yes	DNL is the only Government approved metric for assessing the significance of noise impacts. However, Section 3.4, Noise provides additional supplemental metrics to better describe the experience of an overflight.
recommend the DEIS indicate the change in noise level that will occur for a given area or landmark. Interpret this change in level for the reader by indicating that, according to the Federal Interagency Committee on Noise (FICON) Technical Subgroup, a 3 dB increase in noise is characterized as “a large change” in the level of noise exposure when the existing condition is below 65 dB, and that this increase can be perceived by people as a degradation of their noise environment.	Yes	Section 3.4 Noise and Section 3.7 Land Use.

recommend use of the Average Busy Day metric instead of an Annual Average Day, where annual operations are averaged over an entire 365-day year. DoD Instruction 4165.57 states that where the DoD component determines that AAD does not adequately represent the aircraft noise impacts at a particular air installation, average busy day (ABD) operations can be used with supporting rationale.	Yes	Section 3.4 Noise and Technical Appendix J provide analysis methodology.
Estimate the number of individuals that would experience noise impacts, not just acreage	Yes	Information on population within the ROI is provided in Section 3.8, Socioeconomics.
DEIS should describe the startle effects from sudden and unexpected onset of very loud noise from military flyovers at low elevations and utilize the metric Lmax to represent the loudest overflights heard in the moment. Indicate the levels that can exceed the pain threshold, causing momentary pain, and convey that sudden loud events can disrupt occupational activities, some requiring precision, and the hazard startle effects can have for such workers.	Yes	Section 3.4, Noise provides Lmax values for single events.
The DEIS should clearly indicate not just the number and percentages of sorties that would take place at night for a given area, but approximately how many evenings this would occur.	No	The use of the MOAs occurs during the published times of use. Given the vast size of the airspace, it is not possible to predict how many nights an individual receptor would experience night operations.
The DEIS should identify all schools and daycare centers that could be impacted by infrequent low-level overflights and identify the noise levels from the Proposed Action and Alternatives predicted to classroom interiors, which considers the most common building construction materials for sound level attenuation, and modeled to estimate interior noise levels with windows open and closed.	No	Supplemental metrics, such as classroom speech interference, are required when the DNL exceeds defined thresholds. None of the thresholds for supplemental metrics were exceeded in this analysis. See Appendix J Noise Study and Section 3.4 Noise for results of that analysis.
DoD policy requires hearing loss be assessed in NEPA analyses only when the DNL is 80 and above; however, as stated above, since DNL averages quiet periods with brief but very loud noise exposures, the modeled noise impacts likely will not trigger this requirement. Nevertheless, we strongly recommend a discussion that utilizes Lmax levels, especially if they exceed 114 dB since one 1999 study7 concluded that events with Lmax greater than 114 dB have the potential to cause hearing loss.	Yes	Section 3.4, Noise provides Lmax values for single events.
Overflights and sonic booms impact visitor use and experience at Organ Pipe. Increasing flight hours to midnight in the park, especially during the busy season, from November through April would likely lead to additional visitor experience impacts. The Twin Peaks Campground is the largest in central SW AZ with 208 sites, and an additional 5 group sites and 10 park volunteer sites which are often near full capacity on a regular basis.	Yes	Section 3.4, and Appendix J provides detailed noise analysis. Land Use and Recreation are addressed in Section 3.7. The change to the times of use for Sells MOA are to allow for the MOA to be used as it is currently without the administrative burden of issuing a NOTAM. The actual use of the MOA would remain the same.

The effects of N-wave and U-wave level/targeted maneuvering flight sonic booms at lower altitudes will create unacceptable shockwave pressures.	Yes	Section 3.4, Noise provides supersonic noise analysis.
EIS must evaluate impact of supersonic flights to telescopes at Mt. Graham International Observatory.	Yes	Section 3.4, Noise provides supersonic noise analysis.
The presence of greater disturbances in the Airspace directly above and surrounding the Continental Divide Trail will undoubtedly impact the nature of the trail in this section, both visually and audibly, as well as impacts from ancillary activities that will cause have a cumulative environmental impact on surrounding wildlife and habitat that contribute to the CDNST Experience.	Yes	The CDT is addressed in Section 3.7. Cumulative projects are listed in Appendix G. Cumulative Impacts are discussed with each resource.
ASARCO's Ray Mine operation uses blasting as the means to break bedrock for excavation. Blasting has impact on pit wall slope stability. To mitigate slope/pit wall damage, safety issues (ground control), or economic impacts, ASARCO follows recommendations from licensed geological engineers to meet engineering slope designed angles in each respective sector. Blasting timing of individual blastholes, number of blast holes per delay, and peak partial velocity (PPV) are most germane to Alternatives 2,3,4. Maximum frequency of any blast must be greater than 20 hertz (Hz) as low frequencies < 20 Hz damage pit walls which lead to health and safety concerns and economic impacts. ASARCO deploys 1 to 2 mobile seismographs on every blast conducted at the mine and has a 3rd permanent pit wall seismograph mounted to record vibrational data. It is a scientific fact that sonic booms (sound pressure levels) are produced by aircraft in supersonic flight, and that frequencies of the sonic boom start at 4 Hz. (S. S. Stevens. Perceived level of noise by Mark VII and decibels (E). J. Acoust. Soc. Am., 51(2):575–601, 1972). Vibrations from low-flying supersonic flights which generate low frequency vibrations, can degrade the stability of mine highwalls and lead to rock fall, thereby creating hazardous conditions to personnel and creating a negative impact operational economics. The noise of a jet passing above ASARCO's facilities at the low altitude of 5,000' has a significant potential to cause loss of attention, startling or surprise, or distraction to personnel performing mining or operational activities. Inattention, startling or surprise, or visually searching the sky for passing jets has great potential to cause a minor slip, trip, or fall, to the potential for a major industrial accident with serious harm to life and/or to the environment and/or property.	Yes	Section 3.4, Noise provides supersonic noise analysis.

Biological Resources Concerns

Biological Resources Concerns		
General comments noting impacts from noise on wildlife to include: noise at a level known to cause brain hemorrhages in small mammals, auditory damage and loss of hearing, death, and startle responses. Secondary effects of aircraft noise and sonic booms on wildlife include such nonauditory effects as stress, behavioural changes, interference with mating, and detrimental changes in the ability to obtain sufficient food, water, and cover.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
Many studies suggest that exposure to the noise levels created by sonic booms (even at higher AGL altitudes) can cause stress reactions impacting reproductive behaviours and outcomes as well as physiological damage, for example, to avian hearing.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
Extreme sound disturbances can cause wildlife to abandon important habitat and impact their ability to successfully feed, mate, nest, and raise their young.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
Concerns about bird strikes from aircraft flying that low.	Yes	BASH is discussed in Section 3.3, Safety.
The canyon walls above Cave Creek are more than 1000 ft above the canyon. Flying at 100 ft above ground suggests the pilots will be flying below numerous raptor nests.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
Questions if a study was done to establish per square acre what the flora and fauna species, endangered in particular, are presently existing on the lands in Arizona and New Mexico. The exhaust in the atmosphere from the fuel of these jets, as well as the noise factor specifically breaking the sound barrier most assuredly will be detrimental to thriving flora and fauna.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
many animal species use sound to communicate, to detect prey, and to avoid predation. Jet noise can mask communications, interfere with daily cycles, cause stress, and reduce the distance over which animals can perceive important acoustic signals.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
The Sky Island Region of the Madrean hotspot - one of only 36 such internationally designated places on the planet. Among its many exceptional attributes, is the presumed highest combined diversity and density of the earth's birds of prey nesting in the Chiricahua Mountain range.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
In the Bootheel of New Mexico, which the Tombstone MOA completely covers, there are important habitat areas that provide high-quality hunting opportunities. This includes the Peloncillo Mountains, Big Hatchet Mountains, and Little Hatchet Mountains. These areas include significant	Yes	Noise impacts are discussed in Section 3.6, Natural Resources. Impacts to land use management and recreation are provided in Section 3.7.

acreage of public lands managed by the US Forest Service (Coronado National Forest), Bureau of Land Management (Las Cruces District Office), and intermingled State Trust Lands. All of these lands allow for quality hunting by the public and are directly impacted by the Tombstone MOA.		
San Pedro watershed, Aravaipa Canyon has important populations of birds and wildlife and an invaluable population of bighorn sheep that were reintroduced at significant expense and effort by Arizona Game and Fish Department in the 1960s and again more recently (this effort is also financially supported by the Desert Bighorn Sheep Society). Bighorn sheep are part of the wilderness environment and hunted in a limited way along the Aravaipa Canyon rims. Lowering overflights would increase the disturbance to bighorn sheep behavior and negatively affect their mating and reproduction.	Yes	Noise impacts on wildlife are discussed in Section 3.7, Natural Resources.
There are 1,000s of acres in this area that are used for livestock grazing. This will be severely disrupting the livestock's routine and causing them tons of stress.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
When animals stampede, they will tear through fencing causing great damage to infrastructure, injury to the animal, and generally stressing the animals. Having late night operations is also very stressful for the animals including ranchers who are typically in bed by this time. Animals under stress will not graze properly and reproduction is affected.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
This is a risk for horse and rider, especially if it is an outfitter led trail ride with amateur riders.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
The forest trail system passes through areas of steep inclines and deep canyons. Our concern is always for our safety and the safety of our horses when traveling in these areas. Any sudden noise in the quiet of the wilderness can cause a horse to shy and dump its rider.	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
Requests for copies of Biological Opinion or assessments on threatened and endangered species.	Yes	Impacts to threatened and endangered species, including status of consultation with USFWS, are discussed in Section 3.7, Natural Resources.
Desert Tortoise Council Symposium reports of USFWS and USGS research, involving effects on wild tortoise, of extractive industry and permitted hard military uses of "biological refugia" desert wildlands, which are the natural range of Mojave, Morafka and hybridized tortoises. Effects on the tortoise, a "key" animal, are quickly transmitted through all the native mammal and reptile burrowers' ecosystem - dependent on "key" healthy wild tortoise populations. Please consult with biologists of the DTC	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.

and Tortoise Group, to learn about lasting damage to irreplaceable, irretrievable Last Stand wild desert.		
As the proposed impact region includes at least seven Important Bird Areas designated with cooperation by the Department of Defense Partners in Flight as exceptional for conservation, other U.S. and International coalitions which should be engaged in the process of this AF EIS, are: the Partners in Flight and U.S. Important Bird Areas Program, the North American Bird Conservation Initiative, and the Secretariat of Environment and Natural Resources of Mexico (SEMARNAT).	Yes	Noise effects are discussed in Section 3.7 and bird-aircraft strike is discussed in Section 3.3, Safety
Because the US is a participating non-party to the Convention on Migratory Species (CMS) of the United Nations Environment Program; the AF should engage officials of countries which are Party to the CMS MOU and which are the possible origin for migratory birds which travel through the Tombstone MOA - such as Argentina, Chile, Paraguay, and Panama.	No	DAF is consulting with USFWS. Arizona Game and Fish Department is a Cooperating Agency for the EIS.
The DAF must assess risks to rare migrations and nesting caused by frequent supersonic flights. Flights at such speeds, at such levels, close to rock formations would likely lead to damage from sound waves. Has DAF assembled or commissioned research about the effects of such extreme intrusions on avian and other wildlife or vulnerable geological formations?	Yes	Noise impacts on wildlife are discussed in Section 3.7, Natural Resources.
Effects from chaff accumulation should be considered, especially in areas of limited or confined threatened, endangered, or sensitive species habitat, or confined aquatic habitat and limited or avoided.	Yes	Impacts on wildlife are discussed in Section 3.7, Natural Resources.
Statements concerning the presence of and/or the potential impact to a specific threatened or endangered species beneath the airspace to include: Mexican spotted owl, jaguar, big horn sheep, Elegant Trogon, Montezuma Quail, Mexican Gray Wolf, Bald Eagle, Golden Eagle, Gourd's turkey, white sided jackrabbit, Chiricahua Leopard Frog, New Mexico Ridge-nosed rattlesnake, Southwestern Willow Flycatcher, Mexican chickadee, and Yellow-billed flycatcher.	Yes	Impacts threatened and endangered species, including status of consultation with USFWS, are discussed in Section 3.7, Natural Resources.
We have migratory patterns of Monarch butterflies, hummingbirds, ladybugs and more that are unique to our area that would be disrupted by Air Force test flights	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources.
'Your low-level level supersonic flights will likely disrupt the migratory flow of birds through the area. (See Wisconson DNR late 1970's Hourican Marsh Canadian geese migratory sound mitigation)	Yes	Noise impacts on wildlife are discussed in Section 3.6, Natural Resources. BASH is discussed in Section 3.3, Safety.
Every year 25,000+ Sandhill Cranes migrate here to winter near Willcox, Whitewater Draw Wildlife Area, Animas, and nearby areas. While here, they fly daily between feeding and roosting areas. These flocks of very large birds fly and migrate at elevations similar to those proposed for your	Yes	BASH is discussed in Section 3.3, Safety.

training runs, and constitute a serious flight-strike hazard for at least 6 months of the year.		
Scientists have long documented the ecological damage caused by noise pollution. Now a new study published in Basic and Applied Ecology has revealed that plants also suffer. Vibrations generated by noise triggers stress responses that are not much different to those that would be fond in plants exposed to drought. And plant pollinators, like ants and bees, are affected by noise levels as well. Fruit-bearing species need animals, such as deer and birds such as jays, to disperse their seeds. If the animal partners of these plants are harmed, so too are the plants.	No	The proposed action involves optimizing existing SUA that is currently used for military training. Aircraft operations at these altitudes do have the potential to impact vegetation.

Chaff and Flare Concerns, Wildfire Risk

Chaff and Flare Concerns, Wildfire Risk		
Fully assess contamination of air, land, and water from aircraft emissions and release of chaff and flares, as a daily tally, weekly tally, and monthly cumulative figures.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
The chaff is of concern as well. Is it degradable? What happens if someone is hiking and is covered in it? Is it dangerous to humans or animals if it gets into a pool of water and is ingested? After all, the Tombstone MOA includes the Chiricahua Mountains, which are the source of small rivers and streams and is an area with many hiking and camping facilities.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
Many residents here have respiratory issues. Chaff may negatively affect the health of sensitive people.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
I have read that "Teflon coating fumes are deadly to birds since their respiratory systems are more fragile than ours." (WebMD.com) and "the degradation by-products are lethal to birds" (Wikipedia, quoting "Key Safely Questions About Teflon Nonstick Coatings" DuPont).	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
I have also read that the compound perfluorooctanoic acid (in Teflon) has been the greatest safety concern for humans. I know that the EPA put up a program to eliminate the use of PFOA by 2015, but where is the evidence that this is no longer used in your Air Force flares? Has it been replaced with something safe? Can you provide a link to proof regarding either question? Are these chemicals safe for ground water and soil, not to mention birds and other wildlife?	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
No Chaffs because even though they are small particles, it is littering synthesis materials (the plastic end caps and thousands of fine hair sized metal silica fiber particles). Livestocks and wild animals could consume those items.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects

Refined aluminum is NOT a natural component of these places. What is the purpose of training pilots to release chaff? surely technology can be used to simulate the objectives of this important exercise. If the pursuing aircraft's navigational system has to zone into the flare target, can it be done electronically	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
The Air Force's document: Environmental: Effects of Self Protection Chaff and Flares (1997) states on page two of the Executive Summary that, Use of Chaff over or immediately adjacent to highly sensitive areas such as Wilderness Areas, Wild and Scenic Rivers, National Parks and Monuments, and other pristine natural areas may be incompatible with land use and management objectives for those areas. Additionally, with respect to the use of flares, page four of the Executive Summary states flares should not be used over areas sensitive to fire hazard or during high risks periods. The NOAA has stated that the areas in question have been at a higher risk of fire. Chapter Four page 33 of this document further state that flare fires have occurred in Nevada where the minimal release altitude was 5000 ft. (alternate proposal could lower the release limit to 2000 ft)	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
Crystalline silica is being compared to asbestos. What are the mechanisms by which crystalline silica can become loose from the chaff component? Have you done any air test studies to find out what the levels of crystalline silica are in the air under various conditions including when chaff may be disturbed by flares, wildfire, etc. which for example may lead to the coating coming off and exposing crystalline silica?	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
Chaff should not be utilized in or near (drift) National Forest nor Wilderness Areas and specifically areas designated as Critical Habitat. Most of the streams in the Gila National Forest are identified by the New Mexico Dept of the Environment as Outstanding Natural Resource Waters.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects; The proposed action and alternatives would not change the floors or change chaff release minimum altitudes for Reserve or Morenci MOAs.
Will the residue chaff on the ground degrade to enough extent to expose the crystalline silica, especially considering the heat and monsoon rain and flooding here?	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
What potentially toxic substances are in chaff and flares (such as crystalline silica for chaff and fluorocarbon substances in flares)?	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
Regarding the Reserve MOA, given increasing forecasts for more extreme weather events and the rugged terrain which can be prohibitive of firefighting ground crews, as was the case in parts of the 2012 Whitewater Baldy Complex Fire, the largest fire in recorded history in New Mexico, which started in rugged, inaccessible area of the wilderness, any further potential for fire risk (ie flares) should be prohibited.	Yes	Fire risk is discussed in Section 3.3, Safety

How will flares affect air quality? For example, I've read that after fireworks air quality is horrible and seen graphs depicting it. Will you provide similar graphs and thorough data?	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
Are any heavy metals associated with chaff and flares and what would their worst concentration be for chaff related at 100 ft and flares at 2000 ft. to a person directly below? Same question regarding all substances that could potentially present harm to health either acutely or over long term exposure under these conditions?	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
It is possible that ingestion or inhalation of chaff fragments could be potentially detrimental to animals. In addition, effects of humans inhaling these particles has not been sufficiently studied. Airborne chaff fragments could be dispersed to areas outside their deployment, drifting to surrounding areas or falling into water sources.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
The targeted MOA areas include creeks, rivers and other small water bodies that could be affected by chaff dumping. We are concerned about the ability of surface or bottom feeding waterfowl and other aquatic species to process ingested tiny strands of aluminized silica. These highly sensitive aquatic habitats are essential to the health of the region.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
Flare pellets contain Teflon that breaks down into sodium trifluoroacetate and potassium perchlorate, among others, which are known to be extremely toxic to aquatic organisms. The EIS should estimate the concentration of flares and chaff fibers to be released in the ten MOAs and evaluate the cumulative impact of deposition of this foreign material to land and waterways.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
The combustion breakdown products of flares (45% PFAS) include tetrafluoroethylene and difluorocarbene radicals, as well as a number of other toxic fluorocarbons. These chemicals are known to be highly toxic to aquatic organisms, even at low concentration. We are concerned that the watershed contamination that will result from flare use in this sensitive habitat will harm the Threatened Chiricahua Leopard Frog, Endangered Desert Pupfish, Endangered Gila Topminnow, as well as the many other species and humans that rely on this water.	Yes	Appendix F is a description of chaff and flares and their potential environmental effects
We expect the EIS to use current data (along with older data) to assess the impacts. We note specifically recent events that have had substantial effects on the region. A series of fires, most notably Horseshoe 2 (225,000 acres affected; 2011), have had a major impact on the environment of the Chiricahua Mountains. A drought since the year 2000 was recently characterized as the worst in at least 1,200 years based on tree ring data, and a period in 2020-2021 was described variously as the worst or second	Yes	Fire risk is discussed in Section 3.3, Safety

worst in Arizona history (2021 brought less relief to the Tombstone MOA than to some areas farther west). Data used in the EIS needs to reflect these changes, and not be solely from wetter earlier decades, such as the 1970s and 1980s		
Comments that provided examples, locations of fires caused by flares. Of special note, Telegraph fire.	Yes	Fire risk is discussed in Section 3.3, Safety
Flares increase fire risk, particularly in the desert environment, forested areas, severe drought conditions, etc.	Yes	Fire risk is discussed in Section 3.3, Safety
Even when the flare does go out as designed, a hot flare reaching the ground is sufficient to ignite dry grasses from the frequent recent droughts.	Yes	Fire risk is discussed in Section 3.3, Safety
Secondary impacts of fires – vegetation removed, erosion increases, floods caused extensive damage	Yes	Fire risk is discussed in Section 3.3, Safety
The never “zero chance” of a catastrophic crash of a military aircraft certainly has potentially devastating impacts relative to wild fire safety.	Yes	Fire risk is discussed in Section 3.3, Safety
The Federal government will be required to fund the fire crews that the Forest Service will be required to fight these fires.	Yes	Fire risk and response procedures are discussed in Section 3.3, Safety
'The absence of published studies on the newer aircraft, modern flares and interjecting low-level supersonic flight; mean only an extrapolation regarding a flare deployed during a rollover 30-degree dive, evasive maneuver with a flare release can be made. As an example, if the aircraft executed the dive at Mach 1.2, reducing speed to be subsonic passing 5000 AGL, then continuing into additional avoidance maneuvers at Mach 0.9; this could equate to the released flare traveling at approximately 1013 feet per second. Using the available published estimates for a low-end burn time, 3-seconds, that flare could travel 3039 feet during that time. This is 1039 feet further than the requested two thousand feet AGL floor requested for flare/chaff deployment.	Yes	Fire risk is discussed in Section 3.3, Safety. Chaff and Flares are discussed in Appendix F.
human caused fires in other times of the year have devastating financial consequences for ranchers because of the lack of forage far from growing seasons. Fires in remote areas of the MBG area are also confronted with the lack of water to fight rangeland fires. Limited water resources are often the water sources that responding fire crews use in order to fight fires in months that aren’t within the monsoon. Ranchers are met with the decision to have fire crews use their stored water resources or have their forage burned.	Yes	Fire risk is discussed in Section 3.3, Safety
Can flammable materials in the air from the wind burn due to flare discharge?	No	Fire risk is discussed in Section 3.3, Safety
Do flammable materials exist AGL that can be elevated upwards from the wind?	No	Fire risk is discussed in Section 3.3, Safety

Ozone is likely more prevalent in the air here due to the high UV levels from the sun here and possibly due to heat as well (consider our elevation near 5,000 ft. having even more UV). As a strong oxidizing agent, how will ozone interact with the flares and chaff along with all that has been mentioned above, such as by reacting with fallout substances? Will this allow for even more unknown and potentially hazardous substances to be created via chemical reaction, and will you explore those?	No	Fire risk is discussed in Section 3.3, Safety Air Quality concerns are addressed in Section 3.5. Chaff and Fares are addressed in Appendix F.
In daily operational activities, ASARCO utilizes many materials, liquids, solids, and gasses, which consist of combustible material and are prone to catching fire if exposed to an ignition source. Fire in mining is a real danger, and ASARCO is required to comply with federal law addressing fire prevention and control in mining. See 30 C.F.R. §§ 56.4000-56.4604. Pursuant to §§ 56.4400, combustible material may not be used near an open flame or other ignition source, near any source of heat, or in an atmosphere that can elevate the temperature of the solvent above the flash point. Such use is in violation of federal law and put personnel, property, and the environment at risk of harm. ASARCO proposes that this issue be thoroughly investigated and considered, and the current ceiling of flare release in the OUTLAW MOA of 3,000' AGL be kept thereby minimizing fires.	Yes	Potential airspace impacts are discussed in Section 3.2 and Safety is discussed in Section 3.3. Flare use would be subject to existing fire safety restrictions and not released below 2,000 feet AGL.

Aircraft Safety Concerns

Aircraft Safety Concerns		
Mining operations, processing, and smelting are all industrial activities that carry inherent safety risks. A vast number of federal, state, and local permits, training, and/or certification are required to operate. Heavy equipment with 400-ton capacity trucks, caustics, flammable materials, explosives, high temperatures, mechanical energy, potential energy, and radiation energy are used daily in the performance of mining operations. A jet(s) flying unannounced at 500' AGL has a great potential to cause loss of attention, startling or surprise, or distraction to personnel performing mining or operational activities. Inattention, startling or surprise, or staring at passing jets has great potential to cause a minor slip, trip, or fall, to the potential for a major industrial accident with serious harm to life and/or to the environment and/or property.	Yes	Noise exposure impacts are provided in Section 3.4.
The DEIS needs to fully evaluate the impact of Class A (total loss of aircraft and loss of life), Class B, and Class C mishaps. In addition, the DEIS needs to identify agency response protocols in forests and	Yes	Section 3.3 of the EIS provides aircraft mishap statistics and incident response procedures. Aircraft mishap rates are calculated based on total flying hours, excluding combat losses due to enemy action, and are not broken down into training

wilderness, which are necessarily quite different from responses in urban areas with available emergency response infrastructure		versus operational hours. Impacts to safety from aircraft operations are presented in Section 3.3 of the EIS. The overall mishap rate for each aircraft using the SUA would not be expected to change because of the Proposed Action. It is impossible to predict the precise location of an aircraft accident; and the possibility for a mishap in a remote area does exist. As described in Section 3.3, local first responders would likely be first on the scene given the distance from the Arizona bases. The Air Force would consult with the appropriate land use manager to minimize direct damage and coordinate actions. As described in EIS, first responders would stabilize the situation and minimize further damage. A National Defense Area would be established around the accident scene and the site would be secured during the investigation. The Air Force would be responsible for site clean-up and any damage claims submitted for the incident. The Air Force response to a crash would follow the same procedures regardless of the location whether it be a rural/remote area, Wilderness Study Area, Wilderness Area, or National Monument. The Air Force would consult with the land use manager to minimize damage or determine site-specific mitigation measures.
We are concerned about and request further data on possible aircraft accidents resulting from the proposed increase in military training. In the Tombstone MOA, we already witness “hot dog” pilots making dangerous low runs through our canyons. Accidents have already happened, and more are inevitable.	Yes	Section 3.3 of the EIS provides aircraft mishap statistics, which are calculated based on total flying hours, excluding combat losses due to enemy action, and are not broken down into training versus operational hours. Impacts to safety from aircraft operations are presented in Section 3.3 of the EIS. The overall mishap rate for each aircraft using the SUA would not be expected to change because of the Proposed Action.
What are the effects on animal / bird migrations and nesting and daytime vs. nighttime activities, including bird strike, “The number of bird strikes has increased with the faster speeds of aircraft,”	Yes	BASH is discussed in Section 3.3, Safety.

Cumulative Impacts

Cumulative Impacts		
Cumulative effects analysis must establish the proper geographic scope and appropriate timeframe for the analysis.	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.

Provide an analysis of the cumulative impacts of these airspace modifications and use of the airspace to resources	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.
Current military training operations noise is acceptable with the exception for the intermittent high altitude supersonic shockwave (Sonic boom) from supersonic operations. The 2018 Superior Municipal Airport Master Plan considers noise issues in future improvements and usage of the airport.	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.
Please review the U.S. Forest Service's Coronado National Forest plans and Resource Management Plans of the BLM, Cochise County Comprehensive Plan and the Fort Huachuca Sentinel Landscape Strategic Plan (2022) to understand how the proposed activities contravene the stated goals and objectives of those plans	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.
Evaluate proposed airspace use in conjunction with the 2009 Continental Divide Trail Comprehensive Plan.	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.
Evaluate cumulative impact on CDT experience, inclusive of whole trail (3,100 miles) not just segments under airspace. What happens in one location has the potential to impact the cumulative CDT experience	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.
Summa Silver Mining: Summa Silver has initiated drilling exploration in Mogollon, NM. This results in related activity such as vehicular traffic, industrial equipment, manpower, lights (I understand some work operated through the night), noise pollution and significant use of local water resources (a local entity in Alma, NM has been hauling truckloads of water to Mogollon for use by Summa Silver).	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.
Analyze the cumulative impacts of the number of flares that will be deployed across the ten MOAs in Arizona and New Mexico, especially in light of climate change and the current megadrought conditions in the Southwest.	Yes	The number of flares that could be deployed under existing conditions (no action alternative) and those proposed under each action alternative is described in Chapter 2 and assessed in Chapter 3 of the EIS.
Provide cumulative analysis of proposal when added to existing use of the MOAs.	Yes	The assessment of impacts of the proposed action and the no action alternative (which represents a continuation of current conditions) is provided for each resource is provided, as required by NEPA.
Examine cumulative effects of proposed project together with all other DoD training areas and operations in and around each alternative location	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.
The wildlife in the region are already dealing with threats due to the loss of connectivity due to the border wall, changing vegetation and climates	Yes	Cumulative impacts are described for each resource carried forward for detailed analysis. A list of cumulative projects is provided in Appendix G.

The Gila Cliff Dwellings National Monument is seeking designation as an International Dark Sky Sanctuary. Changes to and the expansion of these MOA near this area could not only deter the awarding of this designation, but could also significantly alter visitor experience and the natural environment around the National Monument	Yes	Section 2 provides details on nighttime operations and the proposed changes. The percent of sorties that occur at night won't change with the proposed action.

Table 9. Information, Analyses, or References Provided

	Associated Resource Area
Rough guides to the comparative effects of noise are provided by the Purdue Chemistry and the Yale Environmental Health and Safety departments: https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm https://ehs.yale.edu/sites/default/files/files/decibel-level-chart.pdf.	Noise
A noise above 120 decibels can cause immediate harm to the ears. https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html	Noise
From 1966-1972, a major problem for tribal relations and environmental impact in Arizona was that of sonic booms, as recorded by The National Parks Service Archives, in "Sonic Booms and People Problems", Chapter 10 of "Administrative History: Canyon De Chelly National Monument Arizona" https://www.nps.gov/cach/learn/historyculture/upload/cach_adhi.pdf	Noise
In November 2019, Massachusetts General Hospital published a study finding a plausible mechanism linking excess aviation noise to cardiovascular effects", including stroke and heart attacks (Current and Prospective Research of Noise Impacts on Health HMMH Noise News | Volume #2 | March 2020 ; https://www.lawa.org/-/media/lawa-web/environment/lax-community-noise-roundtable/noise_ management_presentations/2020/noisert_200311-aviation-noise-news.ashx/). These findings support an earlier European study. (Aircraft Noise and the Risk of Stroke. Dtsch Arztebl Int. 2019. 116:237-244. https://pubmed.ncbi.nlm.nih.gov/31092311/)	Noise
Aircraft noise is one, if not the most detrimental environmental effect of aviation. It can cause community annoyance, disrupt sleep, adversely affect academic performance of children, and could increase the risk for cardiovascular disease of people" (Aviation Noise Impacts: State of the Science. Noise Health. 2017. 19: 41–50. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5437751/).	Noise
Aircraft noise has also been linked to depression, particularly in the elderly. (Aircraft noise control policy and mental health: a natural experiment based on the Longitudinal Aging Study Amsterdam (LASA). J Epidemiol Community Health. 2021. 75:458-463. https://pubmed.ncbi.nlm.nih.gov/33148682/	Noise
The role of aircraft noise annoyance and noise sensitivity in the association between aircraft noise levels and medication use: results of a pooled-analysis from seven European countries. BMC Public Health. 2021. 21:300. https://pubmed.ncbi.nlm.nih.gov/33546655/	Noise
Data suggest that nighttime aircraft noise can trigger acute cardiovascular mortality. The association was similar to that previously observed for long-term aircraft noise exposure." (Does nighttime aircraft noise trigger mortality? A case-crossover study on 24,886 cardiovascular deaths. Eur Heart J. 2021. 42:835-843. https://pubmed.ncbi.nlm.nih.gov/33245107/	Noise
A review of the effects of aircraft noise on wildlife and humans, current control mechanisms, and the need for further study. (Environ Manage. 2003. 32:418-32. https://pubmed.ncbi.nlm.nih.gov/14986892/	Biological Resources
Military Flights Threaten the Wilderness Soundscapes of the Olympic Peninsula, Washington. (Northwest Science, 94:188-202. 2020. https://complete.bioone.org/journals/northwest-science/volume-94/issue-2/046.094.0208/Military-Flights-Threaten-the-Wilderness-Soundscapes-of-the-Olympic-Peninsula/10.3955/046.094.0208.short	Noise
A growing number of studies have shown that visiting green spaces and being exposed to natural environments can reduce psychological stress. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5981243/	Noise
The effects of anthropogenic noise on animals: a meta-analysis. Biol. Lett.152019064920190649 (http://doi.org/10.1098/rsbl.2019.0649	Biological Resources
The Nature Based Restorative Economy in Santa Cruz County, Arizona https://economics.arizona.edu/nature-based-restorative-economy-santa-cruz-county-arizona	Socioeconomics

	Associated Resource Area
"Hair cell loss was substantially increased in both budgerigars and canaries suggesting that middle ear air pressure regulation and correlated changes in middle ear transfer function are one factor influencing susceptibility to acoustic overstimulation in small birds." https://www.nhsec.nh.gov/projects/2014-04/documents/150420pastoriza.pdf page 7	Biological Resources
Map of Mexican Spotted Owl Critical Habitats: https://www.fws.gov/southwest/es/MSO_CH_map10.html	Biological Resources
In the interest of providing more substantial verification of how noise can affect wildlife, we have provided the following link. For your convenience we have copied the Abstract along with references below: https://onlinelibrary.wiley.com/doi/abs/10.1111/brv.12207	Biological Resources
A decline in the bird population has been scientifically verified, https://www.birds.cornell.edu/home/bring-birds-back/. This reduction is associated with plant extinctions, loss of agriculture and pest control, and the spread of disease, https://www.pnas.org/doi/10.1073/pnas.0408049101	Biological Resources
Within the past few years, many studies have shown light on wildlife behavior under influence of human generated (anthropogenic) noise. So many in fact that Kunc and Scmidt1 authored a meta-analysis paper in 2019. Kunc HP, Schmidt R. 2019. The effects of anthropogenic noise on animals: a meta-analysis. Biol. Lett. 15: 20190649.http://dx.doi.org/10.1098/rsbl.2019.0649	Biological Resources
Brown CL, Hardy AR, Barber JR, Fristrup KM, Crooks KR, et al. (2012) The Effect of Human Activities and Their Associated Noise on Ungulate Behavior. PLoS ONE 7(7): e40505. doi:10.1371/journal.pone.0040505	Biological Resources
Blickley JL, Word KR, Krakauer AH, Phillips JL, Sells SN, et al. (2012) Experimental Chronic Noise Is Related to Elevated Fecal Corticosteroid Metabolites in Lekking Male Greater Sage-Grouse (Centrocercus urophasianus). PLoS ONE 7(11): e50462. doi:10.1371/journal.pone.0050462	Biological Resources
Buxton, R.T., M.F. McKenna, D. Mennitt, E. Brown, K. Fristrup, K.R. Crooks, L.M. Angeloni and G. Wittemyer. Anthropogenic noise in U.S. national parks – sources and spatial extent. Front Ecol Environ 2019; 17(10): 559–564, doi:10.1002/fee.2112	Biological Resources
Other studies indicate the opposite. See Bunch, Thomas D., and Gar W Workman, Sonic Boom/ Animal Stress Project Report on Elk, Antelope and Rocky Mountain Bighorn Sheep, Journal of the Acoustical Society of America, 19 9 3, https://digitalcommons.usu.edu/grcanyon/216/. No such study of the impact of sonic booms or low-level flying aircraft has been undertaken on our Reservation.	Biological Resources
Coronado National Forest Monitoring and Evaluation Report (https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.fs.usda.gov%2FInternet%2FFSE_DOCUMENTS%2Ffseprd593096.pdf&data=04%7C01%7CNMIQGovIMA%40state.nm.us%7Cf2a6a6c2107140b3546208d9f323326f%7C04aa6bf4d436426fbfa404b7a70e60ff%7C0%7C0%7C637808156123091445%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C2000&sdata=kALzrIFXXkNyhiSSzhZlApIqshTEkMu876aPrN2HIJo%3D&reserved=0	Biological Resources

4.0 REFERENCES

USEPA. 2000. Aircraft Contrails Factsheet. September.

Federal Aviation Administration (FAA). 2009. Aircraft Engine Speciated Organic Gases: Speciation of Unburned Organic Gases in Aircraft Exhaust. Accessed at: https://www.faa.gov/regulations_policies/policy_guidance/envir_policy/media/FAA-EPA_TSD_Speciated%20OG_Aircraft_052709.pdf.

National Park Service (NPS). 1994. Report to Congress: Report on Effects of Aircraft Overflights on the National Park System. Prepared pursuant to Public Law 100-91, The National Parks Overflights Act of 1987. September.

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APPENDIX A
NOTICE OF INTENT AND AMENDED NOTICE OF INTENT

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breaking strength of 600 lb (272 kg), 1,700 lb (771 kg) maximum breaking strength sleeves, and line with a breaking strength of less than 2,200 lb (998 kg).

EFP Buoy Line

Six of the eight currently available ASBRS devices require the use of a line for retrieval that is contained and stored at depth by a line management system. The other two release devices do not use line, but instead, utilize the inflation of either a lift bag or inflatable buoy to pull a lead trap to the surface. The styles of line storage vary with device design and includes square, rectangular, domed, circular, and conical cages, oyster mesh bags, canisters, and spools. These have been successfully used in trials and testing in a variety of active fishing operations in the United States and worldwide.

Four of the ASBRS devices in the EFP require floating line to return the buoy or buoys to the surface for retrieval. Currently, the average time for appearance of buoys at depths greater than 100 ft (30.5 m) is approximately 3 minutes. Retrieval generally takes less than 2 minutes, which means that any floating line would be at the surface for less than 5 minutes, and during which time the fishing vessel would be within 20–30 ft (6.1–9.1 m) of the line. Two of the release devices do not incorporate line longer than 10 ft (3.1 m) in their design, and two devices use a harness that clips to the pot. The remaining devices use less than 150 ft (45.7 m) of line which would be stowed inside either a bag or on a spool. Sinking line cannot be used for any ASBRS as it would create a negatively buoyant strain on the buoys and not effectively allow for their return to the surface. All of the ASBRSs with a line storage system would need to be attached between the trap and the buoy. If necessary, several of the ASBRSs may also require a small anchor or weight to be attached between the pot and line-storage device or buoy in areas with higher current to keep them from fouling in the pot, as well as to ensure they are not dragged from their intended deployment area. For lift bag and buoy systems, the actual systems would be secured between the pot and the buoy/bag.

NMFS finds the application warrants further consideration based on a preliminary review. Possible conditions the agency may impose on the permit, if granted, include but are not limited to, a prohibition on conducting fishing gear testing within marine protected areas, marine sanctuaries, special management zones, or areas where they might interfere with managed fisheries without additional authorization. Additionally, NMFS may require special protections for ESA-listed species and designated critical habitat, and may require particular gear markings. A final decision on issuance of the EFP will depend on NMFS' review of public comments received on the application, consultations with the appropriate fishery management agencies of the affected states, the South Atlantic Fishery Management Council, and the U.S. Coast Guard, and a determination that the activities to be taken under the EFP are consistent with all applicable laws.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: January 11, 2022.

Ngagne Jafnar Gueye,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2022–00737 Filed 1–14–22; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for Regional Special Use Airspace Optimization To Support Air Force Missions in Arizona

AGENCY: Department of the Air Force, Federal Aviation Administration, Department of Defense.

ACTION: Notice of intent.

SUMMARY: The Department of the Air Force (DAF) is issuing this Notice of Intent (NOI) to advise the public of its intent to prepare an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with optimizing the Special Use Airspace (SUA) managed by the DAF to support aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base ([ANGB] located at Tucson International Airport) in Arizona and to request comments on potential alternatives and impacts, and identification of any relevant information, studies, or analyses of any kind concerning impacts affecting the quality of the human environment.

DATES: This NOI begins the public scoping process for identifying issues and potential alternatives for consideration in the EIS. Notifications are being concurrently published in local newspapers within the potentially affected localities. Scoping comments are requested by March 4, 2022 to ensure full consideration in the Draft EIS in accordance with 40 CFR 1501.9.

In-person scoping meetings will be held at the dates and locations below. All meetings will be open-house style from 5:00 p.m. to 7:00 p.m. (Local). There will not be a formal presentation, please attend at your convenience. Persons with hearing impairments should notify the DAF at least 7 days in advance of the meeting dates to ensure that sign language assistance can be available. Masks worn over the nose and mouth and social distancing are required at all in-person meetings. Spanish interpreters will be available at scoping meetings.

- *February 7, 2022.* Sonoran Desert Inn & Conference Center, 55 South Orilla Avenue, Ajo, Arizona 85321.
- *February 8, 2022.* Superior Town Hall, 199 N Lobb Avenue, Superior, Arizona 85173.
- *February 9, 2022.* Bagdad Event Center, 121 Main Street, Bagdad, Arizona 86321.
- *February 10, 2022.* Congress Fire Department, 26733 Santa Fe Road, Congress, Arizona 85332.
- *February 22, 2022.* Village Hall, 15 Jake Scott Street, Reserve, New Mexico 87830.
- *February 23, 2022.* Clifton Community Center, 100 North Coronado Blvd., Clifton, Arizona 85533.
- *February 24, 2022.* Animas High School, 1 Panther Blvd., Animas, New Mexico 88020.

In addition to the in-person meetings, the project website *www.ArizonaRegionalAirspaceEIS.com* provides a virtual presentation of the meeting materials for those persons that do not wish to attend or are unable to attend an in-person meeting. All the handout(s) and displays for the in-person meetings are available on the website.

The EIS is still in the early planning stages and the schedule is subject to change. The schedule will be updated throughout the EIS process on the project website. Major milestone dates are as follows:

- Draft EIS and Notice of Availability (NOA) publication, Fall 2023
- Draft EIS Public Comment Period and Hearing, Fall 2023
- Final EIS and NOA publication, Summer 2024
- Record of Decision signature, Summer/Fall 2024

ADDRESSES: For questions regarding the Proposed Action or EIS development, or to request sign language assistance at the in-person scoping meetings, contact Grace Keesling, at *grace.keesling.1@us.af.mil* or (210) 925–4534. Comments may be submitted through the project website *www.ArizonaRegionalAirspaceEIS.com,* by mailing to Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666, or in person at the scoping meetings.

SUPPLEMENTARY INFORMATION: The Air Force utilizes portions of the National Airspace System (NAS) for aerial training and test activities known as Special Use Airspace (SUA). As a specific type of SUA, Military Operations Areas (MOAs) are specific airspace, defined by vertical and lateral limits, established for the purpose of separating certain military flight activates from other civil and commercial air traffic. Air Force aircrews stationed in Arizona are continually challenged to meet critical training requirements within existing MOAs established decades ago. The MOAs that are currently used for Air Force training in Arizona, specifically low altitude airspace and airspace that supports supersonic operations at low altitude, have become saturated with aircraft. While the Air Force manages an extensive network of valuable SUA in the region, including the restricted areas associated with the Barry M. Goldwater Range, the volume and attributes associated with the individual MOAs are insufficient to meet the current training requirements. The Air Force is proposing a regional approach that aims at optimizing the existing training airspace to meet current and future mission requirements of multiple users. The airspace proposed for optimization includes the following MOAs: Tombstone, Outlaw, Jackal, Reserve, Morenci, Bagdad, Gladden, Sells, Ruby, and Fuzzy. These MOAs overlie land located throughout southern Arizona and a small portion of western New Mexico.

The purpose of the Proposed Action is to optimize existing Air Force SUA to address the existing and future training deficiencies of aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB due to existing airspace limitations. The need for the Proposed Action is driven by two primary factors: The need for aircrews to be able to conduct flight training near their home base; and the need to conduct required training to ensure readiness and increase survivability. As currently configured, the identified MOAs do not provide the appropriate altitudes (down to 500 feet above ground level [AGL] and lower), terrain variety, and attributes (ability to fly supersonic at lower altitude and use of chaff and flares) to support required training.

The Proposed Action is to modify existing Air Force MOAs to address existing and future training deficiencies. The Proposed Action includes changing published times of use; adjusting the horizontal dimensions of some airspace; lowering the floor of some airspace to allow for low-altitude training; and adjusting airspace attributes to allow for supersonic speed at lower altitude and use of chaff and flares. The Proposed Action does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment.

Three preliminary action alternatives that meet the purpose and need for the Proposed Action have been developed. Comments received during scoping may result in changes or additions to these alternatives. Additionally, the No Action Alternative (Alternative 1), whereby the proposed modifications of the training airspace would not occur, will be evaluated to provide a benchmark that will enable Air Force decision makers to compare the magnitude of the environmental effects of the Proposed Action and any reasonable alternatives.

Alternative 2 (Proposed Action) would optimize the existing Air Force managed airspace, including the following changes to the times of use, horizontal and vertical dimensions, and attributes: Published times of use for all MOAs would be modified to provide consistency across the airspace; Tombstone A, B, and C would be combined and the northern boundary of the MOA and associated Tombstone Air Traffic Control Assigned Airspace (ATCAA) would be expanded; an exclusion zone would be established below 13,000 feet above mean sea level (MSL) surrounding Bisbee Douglas International Airport; the floor of Tombstone MOA would be lowered to 100 AGL from the existing 500 feet AGL; the floors of Outlaw and Jackal MOAs would be lowered to 500 feet AGL from the existing 3,000 feet AGL; the floors of the Bagdad and Gladden MOAs would be lowered to 500 feet AGL from the existing 5,000 feet AGL; use of chaff would be authorized in Tombstone MOA; the minimum flare release altitude in Tombstone, Gladden, and Bagdad MOAs would be lowered to 2,000 feet AGL from 5,000 feet AGL; the minimum flare release altitude in Outlaw and Jackal MOAs would be lowered to 2,000 feet AGL from 3,000 feet AGL; and the authorization for supersonic flight would be lowered to 5,000 feet AGL from the existing 30,000 feet MSL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

Alternative 3 would include those modifications proposed for Alternative 2 except that the northern boundary of the Tombstone MOA/ATCAA would not be expanded. Additionally, to increase the volume of airspace available to support Davis-Monthan AFB, the floor of Jackal MOA would also be lowered to 100 feet AGL from the existing 3,000 feet AGL.

Alternative 4 would include those modifications proposed in Alternative 2 except supersonic flight would be authorized down to 10,000 feet AGL in the Tombstone, Outlaw, Jackal, Morenci and Reserve MOAs (vs 5,000 feet AGL in Alternative 2). While this option would not fully optimize the airspace for supersonic operations, lowering the authorized altitude in the MOAs would improve the current capabilities.

Based on previous NEPA actions in the region and familiarity with the affected environment, the following is a preliminary list of issues and concerns that will be the focus in the EIS: Noise and sonic boom impacts to domestic animals, wildlife, special status species, children, quality of life, property values, homes, and cultural resources; effects to cultural resources and Native American tribes; effects to Environmental Justice populations; aircraft safety and impacts to civilian pilots (crop dusting, predator control, and cattle management) and commercial operations; air quality impacts to wildlife and public; effects from use of chaff and flares, specifically fire risk; and effects to special use land management areas such as wilderness areas, national wildlife refuges, and national parks/monuments.

Scoping and Agency Coordination: To effectively define the full range of issues and alternatives to be evaluated in the EIS, the Air Force is soliciting comments from interested local, state and federal elected officials and agencies, Tribes, as well as interested members of the public and others. The DAF is requesting comments concerning the proposed SUA optimization, feasible alternatives, possible measures to mitigate, minimize and/or avoid adverse environmental impacts, and any other information relevant to the Proposed Action and any reasonable alternatives.

The U.S. Fish and Wildlife Service, State Historic Preservation Offices for Arizona and New Mexico, and tribes with interest in land beneath the airspace are being consulted to ensure compliance with the Endangered Species Act and National Historic Preservation Act. The Federal Aviation Administration (FAA) has agreed to be a Cooperating Agency for this action. The FAA would update aeronautical charts to reflect any modifications to existing airspace that result from this proposal and published in FAA Order

JO 7400.10(C), *Special Use Airspace* (*http://www.faa.gov/air_traffic/publications/*).

Adriane Paris,

Air Force Federal Register Liaison Officer.

[FR Doc. 2022–00749 Filed 1–14–22; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Department of the Army

Appointment to the Board of Directors of the Army West Point Athletic Association

AGENCY: Department of the Army, DOD.

ACTION: Notice of designation as an entity for which DOD personnel may participate in management activities.

SUMMARY: The Department of the Army is publishing this notice to announce that the DOD Office of General Counsel has designated the Army West Point Athletic Association is an entity for which DOD personnel may participate in management activities.

FOR FURTHER INFORMATION CONTACT: Ms. Lori L. Doughty, Academy Counsel, in writing at Office of the Staff Judge Advocate, ATTN: Ms. Lori L. Doughty, 646 Swift Road, West Point, NY 10996; by email at *lori.doughty@westpoint.edu;* or by telephone at 845–938–3205.

SUPPLEMENTARY INFORMATION: The Army West Point Athletic Association (AWPAA) is the 501(c)(3) corporation organized under the provisions of Title 10, United States Code, section 7462 to execute the U.S. Military Academy's intercollegiate athletics mission. The AWPAA is governed by a board of directors (BOD), which is responsible for the day-to-day operations of the AWPAA as well as the general corporate responsibilities of the organization. Of the minimum of seven BOD positions made available under its bylaws, three are reserved for members of the Armed Forces. The purpose of Armed Forces membership on the AWPAA BOD is to provide oversight and advice to, and coordination with AWPAA, but will not extend to the day-to-day operations of the AWPAA.

James W. Satterwhite, Jr.,

Army Federal Register Liaison Officer.

[FR Doc. 2022–00762 Filed 1–14–22; 8:45 am]

BILLING CODE 5001–03–P

DEPARTMENT OF DEFENSE

Office of the Secretary

Defense Business Board; Notice of Federal Advisory Committee Meeting

AGENCY: Office of the Deputy Secretary of Defense, Department of Defense (DoD).

ACTION: Notice of Federal Advisory Committee meeting.

SUMMARY: The DoD is publishing this notice to announce that the following Federal Advisory Committee meeting of the Defense Business Board (''the Board'') will take place.

DATES: Open to the public Wednesday, February 2, 2022 from 10:00 a.m. to 12:00 p.m. Eastern time.

ADDRESSES: Due to the current guidance on combating the Coronavirus, the meeting will be conducted virtually or by teleconference only. To participate in the meeting, see the Meeting Accessibility section for instructions.

FOR FURTHER INFORMATION CONTACT: Ms. Jennifer Hill, Designated Federal Officer of the Board in writing at Defense Business Board, 1155 Defense Pentagon, Room 5B1088A, Washington, DC 20301–1155; or by email at *jennifer.s.hill4.civ@mail.mil*; or by phone at 571–342–0070.

SUPPLEMENTARY INFORMATION: This meeting is being held under the provisions of the Federal Advisory Committee Act (FACA) (5 U.S.C.), the Government in the Sunshine Act (5 U.S.C. 552b), and 41 CFR 102–3.140 and 102–3.150.

Purpose of the Meeting: The mission of the Board is to examine and advise the Secretary of Defense on overall DoD management and governance. The Board provides independent advice reflecting an outside private sector perspective on proven and effective best business practices that can be applied to DoD.

Agenda: The Board meeting will begin February 2, 2022 at 10:00 a.m. Eastern time with opening remarks by Jennifer Hill, the Designated Federal Officer. The Board will then receive remarks by the Board Chair, and remarks by the Deputy Secretary of Defense. The Board will then receive a briefing on Energy Reform from Mr. Richard Kidd, Deputy Assistant Secretary of Defense for Energy & Environment Resilience. The meeting will conclude with closing remarks by the Board Chair and Designated Federal Officer. The latest version of the agenda will be available upon publication of the **Federal Register** on the Board's website at: *https://dbb.defense.gov/Meetings/Meeting-February-2022/.*

Meeting Accessibility: Pursuant to the FACA and 41 CFR 102–3.140, the meeting on February 2, 2022 from 10:00 a.m. to 12:00 p.m. is open to the public. Persons desiring to participate in the public session are required to register. Attendance will be by teleconference only. To attend the public session, submit your name, affiliation/organization, telephone number, and email contact information to the Board at *osd.pentagon.odam.mbx.defense-business-board@mail.mil.* Requests to attend the public meeting must be received no later than 3:00 p.m. Eastern time, on Tuesday, February 1, 2022. Upon receipt of this information, a teleconference line number will be sent to the email address provided which will allow teleconference attendance to the event. (The DBB will be unable to provide technical assistance to any user experiencing technical difficulties during the meeting.)

Written Comments and Statements: Pursuant to 41 CFR 102–3.105(j) and 102–3.140 and section 10(a)(3) of the FACA, the public or interested organizations may submit written comments or statements to the Board in response to the stated agenda of the meeting or in regard to the Board's mission in general. Written comments or statements should be submitted to Ms. Jennifer Hill, the Designated Federal Officer, via electronic mail (the preferred mode of submission) at the address listed in the **FOR FURTHER INFORMATION CONTACT** section. Each page of the comment or statement must include the author's name, title or affiliation, address, and daytime phone number. The Designated Federal Officer must receive written comments or statements being submitted in response to the agenda set forth in this notice by January 26, 2022 to be considered by the Board. The Designated Federal Officer will review all timely submitted written comments or statements with the Board Chair, and ensure the comments are provided to all members of the Board before the meeting. Written comments or statements received after this date may not be provided to the Board until its next scheduled meeting. Pursuant to 41 CFR 102–3.140d, the Board is not obligated to allow any member of the public to speak or otherwise address the Board during the meeting. Members of the public will be permitted to make verbal comments during the meeting only at the time and in the manner described below. If a member of the public is interested in making a verbal comment at the meeting, that individual must submit a request, with a brief statement of the subject matter to be

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discussion, those issues may not be the subject of formal STT action during these meetings. STT action will be restricted to those issues specifically listed in this document and to any issues arising after publication of this document requiring emergency action under Section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act, provided the public has been notified of the STT's intent to take final action to address the emergency.

Specific meeting information, including instructions on how to join the meeting and system requirements will be provided in meeting announcements on the Pacific Council's website (see *www.pcouncil.org*). You may send an email to Mr. Kris Kleinschmidt (*kris.kleinschmidt@noaa.gov*) or contact him at (503) 820–2412 for technical assistance.

Special Accommodations

Requests for sign language interpretation or other auxiliary aids should be directed to Mr. Kris Kleinschmidt (*kris.kleinschmidt@noaa.gov;* (503) 820–2412) at least 10 days prior to the meeting date.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: April 29, 2022.

Tracey L. Thompson,

Acting Deputy Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2022–09531 Filed 5–3–22; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648–XB999]

Fisheries of the Gulf of Mexico; Southeast Data, Assessment, and Review (SEDAR); Public Meeting

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of SEDAR 74 Post-Data Workshop Webinar for Gulf of Mexico Red Snapper.

SUMMARY: The SEDAR 74 assessment of Gulf of Mexico red snapper will consist of a Data workshop, a series of assessment webinars, and a Review workshop. See **SUPPLEMENTARY INFORMATION**.

DATES: The SEDAR 74 Post-Data Workshop Webinar will be held May 23, 2022, from 10 a.m. to 12 p.m., Eastern.

ADDRESSES:

Meeting address: The meeting will be held via webinar. The webinar is open to members of the public. Those interested in participating should contact Julie A. Neer at SEDAR (see **FOR FURTHER INFORMATION CONTACT** below) to request an invitation providing webinar access information. Please request webinar invitations at least 24 hours in advance of each webinar.

SEDAR address: 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405.

FOR FURTHER INFORMATION CONTACT: Julie A. Neer, SEDAR Coordinator; (843) 571–4366; email: *Julie.neer@safmc.net*.

SUPPLEMENTARY INFORMATION: The Gulf of Mexico, South Atlantic, and Caribbean Fishery Management Councils, in conjunction with NOAA Fisheries and the Atlantic and Gulf States Marine Fisheries Commissions have implemented the Southeast Data, Assessment and Review (SEDAR) process, a multi-step method for determining the status of fish stocks in the Southeast Region. SEDAR is a multi-step process including: (1) Data Workshop; (2) Assessment Process utilizing webinars; and (3) Review Workshop. The product of the Data Workshop is a data report that compiles and evaluates potential datasets and recommends which datasets are appropriate for assessment analyses. The product of the Assessment Process is a stock assessment report that describes the fisheries, evaluates the status of the stock, estimates biological benchmarks, projects future population conditions, and recommends research and monitoring needs. The assessment is independently peer reviewed at the Review Workshop. The product of the Review Workshop is a Summary documenting panel opinions regarding the strengths and weaknesses of the stock assessment and input data. Participants for SEDAR Workshops are appointed by the Gulf of Mexico, South Atlantic, and Caribbean Fishery Management Councils and NOAA Fisheries Southeast Regional Office, HMS Management Division, and Southeast Fisheries Science Center. Participants include data collectors and database managers; stock assessment scientists, biologists, and researchers; constituency representatives including fishermen, environmentalists, and NGO's; International experts; and staff of Councils, Commissions, and state and federal agencies.

The items of discussion in the Post-Data Workshop Webinar are as follows:

Participants will review data for use in the assessment of Gulf of Mexico red snapper.

Although non-emergency issues not contained in this agenda may come before this group for discussion, those issues may not be the subject of formal action during this meeting. Action will be restricted to those issues specifically identified in this notice and any issues arising after publication of this notice that require emergency action under section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act, provided the public has been notified of the intent to take final action to address the emergency.

Special Accommodations

The meeting is physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to the Council office (see **ADDRESSES**) at least 5 business days prior to each workshop.

Note: The times and sequence specified in this agenda are subject to change.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: April 29, 2022.

Tracey L. Thompson,

Acting Deputy Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2022–09530 Filed 5–3–22; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Amended Notice of Intent To Prepare an Environmental Impact Statement for Regional Special Use Airspace Optimization To Support Air Force Missions in Arizona

AGENCY: United States Air Force, Department of Defense.

ACTION: Amended Notice of Intent.

SUMMARY: On January 18, 2022, the Department of the Air Force (DAF) issued a Notice of Intent to prepare an Environmental Impact Statement (EIS) for Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona (Vol. 87, No. 11 **Federal Register**, 2597, January 18, 2022). The Notice of Intent announced a 45-day formal scoping period through March 4, 2022, included the dates and locations of in-person scoping meetings, and solicited public comments on the DAF's proposed action. In response to public and stakeholder input received during the initial scoping period, the DAF has decided to extend the formal scoping comment period for this EIS. This Amended Notice of Intent extends the formal scoping comment period through June 3, 2022 to allow additional

time for the interested public to review the proposed action and submit scoping comments. No changes have been made to the proposed action. All handouts and displays are available on the project website (*www.ArizonaRegional AirspaceEIS.com*). Comments submitted during the initial public scoping period from January 18–March 4, 2022 are currently being reviewed and do not need to be resubmitted. Further comments can be provided through the project website and via mail to the address listed below.

DATES: The extended public scoping comment period begins upon publication of this Notice. Further scoping comments are requested by June 3, 2022 to ensure full consideration in the Draft EIS in accordance with 40 CFR 1501.9.

ADDRESSES: Please mail public scoping comments to: Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666. Comments may also be submitted through the project website *www.ArizonaRegionalAirspaceEIS.com.*

FOR FURTHER INFORMATION CONTACT: Ms. Grace Keesling, Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666; Telephone: (210) 925–4534 at grace; or Email: *keesling.1@us.af.mil.*

Adriane Paris,

Air Force Federal Register Liaison Officer.

[FR Doc. 2022–09579 Filed 5–3–22; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

Combined Notice of Filings

Take notice that the Commission has received the following Natural Gas Pipeline Rate and Refund Report filings:

Filings Instituting Proceedings

Docket Numbers: RP22–843–000.
Applicants: Transcontinental Gas Pipe Line Company, LLC.
Description: § 4(d) Rate Filing: Rate Schedule S–2 Tracker Filing eff 4/1/2022 to be effective 4/1/2022.
Filed Date: 4/27/22.
Accession Number: 20220427–5239.
Comment Date: 5 p.m. ET 5/9/22.

Docket Numbers: RP22–844–000.
Applicants: Discovery Gas Transmission LLC.
Description: Annual Imbalance Cash Out Report for 2021 of Discovery Gas Transmission LLC.
Filed Date: 4/27/22.
Accession Number: 20220427–5246.
Comment Date: 5 p.m. ET 5/9/22.

Docket Numbers: RP22–845–000.
Applicants: Transcontinental Gas Pipe Line Company, LLC.
Description: § 4(d) Rate Filing: Rate Schules GSS and LSS Tracker Filing eff 4/1/2022 to be effective 4/1/2022.
Filed Date: 4/27/22.
Accession Number: 20220427–5311.
Comment Date: 5 p.m. ET 5/9/22.

Docket Numbers: RP22–846–000.
Applicants: Bison Pipeline LLC.
Description: Compliance filing: 2022 Operational Purchases and Sales Report to be effective N/A.
Filed Date: 4/27/22.
Accession Number: 20220427–5313.
Comment Date: 5 p.m. ET 5/9/22.

Docket Numbers: RP22–847–000.
Applicants: Columbia Gas Transmission, LLC.
Description: § 4(d) Rate Filing: MU Mktg LLC—Replacement Contract NR_264870_264871 to be effective 4/1/2022.
Filed Date: 4/27/22.
Accession Number: 20220427–5331.
Comment Date: 5 p.m. ET 5/9/22.

Docket Numbers: RP22–849–000
Applicants: Ruby Pipeline, L.L.C.
Description: § 4(d) Rate Filing: Fuel LU and EPC Computation Update Filing to be effective 6/1/2022.
Filed Date: 4/28/22.
Accession Number: 20220428–5098.
Comment Date: 5 p.m. ET 5/10/22.

Docket Numbers: RP22–850–000.
Applicants: Southeast Supply Header, LLC.
Description: § 4(d) Rate Filing: 2022 SESH TUP/SBA Annual Filing to be effective 6/1/2022.
Filed Date: 4/28/22.
Accession Number: 20220428–5099.
Comment Date: 5 p.m. ET 5/10/22.

Docket Numbers: RP22–851–000.
Applicants: Cheyenne Plains Gas Pipeline Company, L.L.C.
Description: § 4(d) Rate Filing: Fuel and LU Annual Update and OPS Report to be effective 6/1/2022.
Filed Date: 4/28/22.
Accession Number: 20220428–5104.
Comment Date: 5 p.m. ET 5/10/22.

Docket Numbers: RP22–852–000.
Applicants: Wyoming Interstate Company, L.L.C.
Description: § 4(d) Rate Filing: FL&U Update Quarterly Filing to be effective 6/1/2022.
Filed Date: 4/28/22.
Accession Number: 20220428–5117.
Comment Date: 5 p.m. ET 5/10/22.

Docket Numbers: RP22–853–000.
Applicants: Transwestern Pipeline Company, LLC.
Description: § 4(d) Rate Filing: Housekeeping Filing on 4–28–22 to be effective 5/31/2022.
Filed Date: 4/28/22.
Accession Number: 20220428–5119.
Comment Date: 5 p.m. ET 5/10/22.

Docket Numbers: RP22–854–000.
Applicants: Sierrita Gas Pipeline LLC.
Description: § 4(d) Rate Filing: Quarterly Fuel and LU Update Filing to be effective 6/1/2022.
Filed Date: 4/28/22.
Accession Number: 20220428–5129.
Comment Date: 5 p.m. ET 5/10/22.

Any person desiring to intervene or protest in any of the above proceedings must file in accordance with Rules 211 and 214 of the Commission's Regulations (18 CFR 385.211 and 385.214) on or before 5:00 p.m. Eastern time on the specified comment date. Protests may be considered, but intervention is necessary to become a party to the proceeding.

The filings are accessible in the Commission's eLibrary system (*https://elibrary.ferc.gov/idmws/search/fercgensearch.asp*) by querying the docket number.

eFiling is encouraged. More detailed information relating to filing requirements, interventions, protests, service, and qualifying facilities filings can be found at: *http://www.ferc.gov/docs-filing/efiling/filing-req.pdf.* For other information, call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Dated: April 28, 2022.

Debbie-Anne A. Reese,

Deputy Secretary.

[FR Doc. 2022–09543 Filed 5–3–22; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. CP22–181–000]

Columbia Gas Transmission, LLC; Notice of Request Under Blanket Authorization and Establishing Intervention and Protest Deadline

Take notice that on April 19, 2022, Carolina Gas Transmission, LLC, 121 Moore Hopkins Lane, Columbia, South Carolina 29210 filed in the above referenced docket a prior notice pursuant to Section 157.205 and 157.210 of the Federal Energy Regulatory Commission's regulations under the Natural Gas Act, requesting authorization to construct, modify and operate certain facilities located in the Counties of Spartanburg, Dorchester and Charleston, South Carolina, under authorities granted by its blanket

APPENDIX B
INTERAGENCY COORDINATION

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Letter Template Name	**Recipients**
Elected Official	*Members of Congress:* Senator Mark Kelley (Arizona) Senator Kyrsten Sinema (Arizona) Senator Martin Heinrich (New Mexico) Senator Ben Ray Lujan (New Mexico) Representative Tom O'Halleran (Arizona District 1) Representative Ann Kirkpatrick (Arizona District 2) Representative Raul Grijalva (Arizona District 3) Representative Paul Gosar (Arizona District 4) Representative Yvette Harrell (New Mexico District 2)
Elected Official	*Arizona State Legislature:* Governor Doug Ducey Representative Judy Burges (House District 1) Representative Quang Nguyen (House District 1) Representative Andrea Delessandro (House District 2) Representative Daniel Hernandez, Jr. (House District 2) Representative Charlene Fernandez (House District 4) Representative Joel John (House District 4) Representative Leo Biasiucci (House District 5) Representative Regina Cobb (House District 5) Representative Brenda Barton (House District 6) Representative Walter Blackman (House District 6) Representative Jasmine Blackwater-Nygren (House District 7) Representative David Cook (House District 8) Representative Tim Dunn (House District 13) Representative Joanne Osborne (House District 13) Representative Gail Griffin (House District 14) Representative John Fillmore (House District 16) Representative Jacqueline Parker (House District 16) Representative Joseph Chaplik (House District 23) Representative John Kavanagh (House District 23) Senator Karen Fann (Senate District 1) Senator Rosanna Gabaldon (Senate District 2) Senator Lisa Otondo (Senate District 4) Senator Sonny Borrelli (Senate District 5) Senator Wendy Rogers (Senate District 6) Senator Jamescita Peshlakai (Senate District 7) Senator Thomas Shope (Senate District 8) Senator Sine Kerr (Senate District 13) Senator David Gowan (Senate District 14) Senator Kelly Townsend (Senate District 16) Senator Michelle Ugenti-Rita (Senate District 23)
Elected Official	*New Mexico State Legislature:* Governor Michelle Lujan Grisham Representative Candi Sweetser (House District 32) Representative Rebecca Dow (House District 38) Representative Gail Armstrong (House District 49) Senator Gabriel Ramos (Senate District 28)

	Senator Crystal Diamond (Senate District 35)
Elected Official	*Arizona County Commissions:* Graham County, Dustin Welker Apache County, Ryan Patterson Cochise County, Tom Crosby Cochise County, Ann English Cochise County, Peggy Judd Gila County, James Menlove Gila County, Jacke Sanders Greenlee County, David Gomez Greenlee County, Ron Campbell Greenlee County, Richard Lunt La Paz County, David Plunkett La Paz County, Duce Minor La Paz County, Holly Irwin Maricopa County, Joy Rich Mohave County, Bassam Elters Mohave County, Melissa Ware Mohave County, Yvonne Orr Navajo County, Glenn Kephart Navajo County, Bryan Layton Pima County, Chuck Huckleberry Pima County, Jan Lesher Pinal County, Leo Lew Pinal County, Himanshu Patel Pinal County, Mary Ellen Sheppard Santa Cruz County, Jennifer St. John Yavapai County, Phil Bourdon Yavapai County, Jack Fields
Elected Official	*New Mexico County Commissions:* Catron County, Anita Hand Catron County, John Snyder Grant County, Charlene Webb Grant County, Chris Ponce Hidalgo County, Tisha Green Hidalgo County, Joey Mora Luna County, Chris Brice
Elected Official	*Arizona Mayors:* Jeff Serdy (City of Apache Junction) Craig MacFarland (City of Casa Grande) Donald Huish (City of Douglas) Jerry Weiers (City of Glendale) Al Gameros (City of Globe) Christiania Price (City of Maricopa) John Giles (City of Mesa) Arturo Garino (City of Nogales) Kate Gallego (City of Phoenix) Greg Mengarelli (City of Prescott and Bagdad) Jason Kouts (City of Safford) Regina Romero (City of Tucson) Cal Sheehy (Lake Havasu City) Doug Von Gausig (Town of Clifton)

	Tommy Lee Sikes (Town of Gila Bend) Dan Beaver (Town of Parker) CB Fletcher (Town of Pima) Mila Besich Lira (Town of Superior) Rui Pereira (Town of Wickenburg)
Elected Official	*New Mexico Mayors:* Rudy Martinez (City of Bayard) Robert Barrera (City of Lordsburg) Connie Cordell (Village of Reserve)
USFWS	U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office U.S. Fish and Wildlife Service, Southwest Region
SHPO_BIA	New Mexico Historic Preservation Division Arizona Historic Preservation Office Arizona Governor's Office on Tribal Relations Bureau of Indian Affairs, Navajo Region Bureau of Indian Affairs, Western Region Bureau of Indian Affairs, Southwest Region
Federal Agency_Potential Cooperating	Bureau of Land Management Arizona State Office Bureau of Land Management New Mexico State Office U.S. Forest Service, Gila National Forest U.S. Forest Service, Apache-Sitgreaves National Forest U.S. Forest Service, Tonto National Forest National Park Service, Regional Director Intermountain Region Bill Williams Rivers National Wildlife Refuge Buenos Aires National Wildlife Refuge Cabeza Prieta National Wildlife Refuge Lesley Canyon National Wildlife Refuge San Bernadino National Wildlife Refuge
Other Agency	Environmental Protection Agency, Region 6 Environmental Protection Agency, Region 9 Arizona Department of Environmental Quality New Mexico Environment Department Arizona Game and Fish New Mexico Department of Game and Fish Arizona Department of Transportation New Mexico Department of Transportation Bureau of Reclamation, Phoenix Area Office Arizona State Land Arizona State Parks Alama Lake State Park Granite Mountain Hotshots Memorial State Park Roper Lake State Park Gila Box Riparian National Conservation Area Gila National Forest, Glenwood Ranger District Gila National Forest, Wilderness Ranger District Tonto National Forest, Globe Ranger District Tonto National Forest, Mesa Ranger District Coronado National Forest, Nogales Ranger District Coronado National Forest, Safford Ranger District Apache-Sitgreaves National Forest, Springerville Ranger District Organ Pipe Cactus National Monument

	Sonoran Desert National Monument
General Memo	National Business Aviation Association Airlines for America Aircraft Owners and Pilots Association New Mexico Pilots Association Arizona Pilots Association Center for Biological Diversity Sierra Club The Wilderness Society Arizona Audubon
General Memo	Public and Private Airports in Arizona Public and Private Airports in New Mexico
Tribes	Ak-Chin Chemehuevi Indian Tribe Cocopah Indian Tribe Colorado River Indian Tribe Fort McDowell Yavapai Nation Fort Mojave Indian Tribe Fort Sill Apache Tribe of Oklahoma Fort Yuma-Quechan Tribe Gila River Indian Community Havasupai Tribe Hopi Tribe Hualapai Tribe Jicarilla Apache Nation of New Mexico Kaibab Band of Paiute Indians Kickapoo Tribe of Oklahoma Mescalero Apache Tribe Moapa Band of Paiute Indians Navajo Nation Paiute Indian Tribe of Utah Pascua Yaqui Tribe Pueblo of Zuni Salt River Pima-Maricopa Indian Community San Carlos Apache Tribe San Juan Southern Paiute Tribe Tohono O'odham Nation Tonto Apache Tribe Ute Mountain White Mountain Apache Yavapai Apache Nation Yavapai-Prescott Indian Tribe

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

January 10, 2022

U.S. House of Representatives
Attn: Representative Tom O'Halleran
318 Cannon House Office Building
Washington, DC 20515

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Representative O'Halleran:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), the Department of the Air Force (DAF) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona. The DAF is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAA) to address training needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action is being jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for interagency and intergovernmental coordination.

A MOA is a type of special use airspace with defined spatial boundaries within the National Airspace System designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers and low-altitude operations. ATCAAs are not special use airspace but can support the same training activities that occur in MOAs. An ATCAA exists in higher altitudes within the National Airspace System and can be requested by the military to extend the usable training airspace. ATCAAs typically have the same horizontal boundaries of the underlying MOA and an agreed upon ceiling.

Many of the DAF managed MOAs available to aircrews in this region were first charted decades ago and have had minimal improvements over time to meet current and evolving training requirements. The DAF is proposing regional airspace modifications to address the training shortfalls caused by the insufficient existing special use airspace to include: changing the published times of use; adjusting the horizontal dimensions of one MOA; lowering the defined floor of some MOAs to allow for additional low-altitude training in the region; and adjusting the attributes of some airspace to allow for supersonic flight below 30,000 feet mean sea level and use of chaff and flares. The Proposed Action does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment.

The special use airspace being addressed in the EIS includes several Air Force managed MOAs and their associated ATCAAs (named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby, and Fuzzy) located throughout Arizona and a small area of western New Mexico (see Enclosure 1).

The DAF is soliciting comments on three preliminary alternatives that would optimize the existing MOAs. The EIS will also evaluate a No Action Alternative per 40 CFR 1502.14 (Alternative 1). Alternative 2 includes all proposed modifications to optimize the MOAs/ATCAAs. Alternatives 3 and 4 are variations of Alternative 2. A summary of each of these is provided below, please visit the project website (www.ArizonaRegionalAirspaceEIS.com) for detailed information on these alternatives.

Alternative 1 (No Action) – airspace optimization would not occur. None of the existing MOAs/ATCAAs would be modified.

Alternative 2 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies for aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB due to insufficient airspace. Major actions would include: changing the published times of use for the MOAs to align with current training hours; increasing the size of the Tombstone MOA/ATCAA by moving the northern boundary approximately 10 nautical miles to the north and lowering the subsonic floor to 100 feet above ground level (AGL); lowering the subsonic floor of four MOAs to 500 feet AGL (Outlaw, Jackal, Bagdad and Gladden MOAs); authorizing the use of chaff in Tombstone MOA and lowering the altitude for releasing flares in Tombstone, Outlaw, Jackal, Bagdad, and Gladden MOAs; and authorizing supersonic flight down to 5,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

Alternative 3 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except for increasing the size of Tombstone MOA/ATCAA by expanding the northern boundary. The subsonic floor of the Tombstone MOA would still be lowered to 100 feet AGL. Additionally, to increase the low-altitude airspace available to support Davis-Monthan AFB, the subsonic floor of Jackal MOA would be lowered to 100 feet AGL.

Alternative 4 - optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except that supersonic flight would be authorized down to 10,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

The DAF published a Notice of Intent to prepare the EIS in the Federal Register initiating the scoping phase of the project, which is the first opportunity for public and stakeholder involvement in the NEPA process. We request your participation and solicit your comments on the potential alternatives to the Proposed Action and information or analyses relevant to the Proposed Action. Please provide your comments no later than **March 4, 2022** to ensure consideration in the Draft EIS in accordance with 40 CFR 1503.3(b); comments submitted after this date shall be considered forfeited. Electronic comments may be submitted on the project website any time prior to the comment deadline, www.ArizonaRegionalAirspaceEIS.com. Written comments may be submitted at the in-person public meetings or by mailing to Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666 (must be postmarked by **March 4, 2022**).

The DAF is hosting several in-person public meetings to provide information on the proposed action and the preliminary alternatives described above. You are invited to attend any of the public meetings listed in Enclosure 2. All of the meetings will be open-house style at each location on the date and times indicated. No formal presentation will be given, please attend at your convenience during the time designated. Project specific display posters will be staffed by Air Force representatives who will be available to answer questions. We encourage you to visit the project website at any time where you can preview all the materials that will be on display at the meetings. If you do not wish to attend an in-person meeting or are unable to do so, the project website provides a Virtual Meeting option that includes all of the same displays and information that will be available at the in-person meetings. We look forward to your participation.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Enclosures: 1. Project Area Map
2. In-person Public Meeting Locations and Schedule

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

U.S. Fish and Wildlife
Field Supervisor
Attn: Mr. Jeff Humphrey
Arizona Ecological Services Field Office
9828 North 31st Avenue, #C3
Phoenix, AZ 85051

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Mr. Humphrey:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), the Department of the Air Force (DAF) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona. The DAF is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAA) to address training needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action is being jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for interagency and intergovernmental coordination and consultation.

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The special use airspace being addressed in the EIS includes several Air Force managed MOAs and their associated ATCAAs (named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby, and Fuzzy) located throughout Arizona and a small area of western New Mexico (see Enclosure 1).

The DAF is soliciting comments on three preliminary alternatives that would optimize the existing MOAs. The EIS will also evaluate a No Action Alternative per 40 CFR 1502.14 (Alternative 1). Alternative 2 includes all proposed modifications to optimize the MOAs/ATCAAs. Alternatives 3 and 4 are variations of Alternative 2. A summary of each of these is provided below, please visit the project website (www.ArizonaRegionalAirspaceEIS.com) for detailed information on these alternatives.

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The DAF is hosting several in-person public meetings to provide information on the proposed action and the preliminary alternatives described above. You are invited to attend any of the public meetings listed in Enclosure 2. All of the meetings will be open-house style at each location on the date and times indicated. No formal presentation will be given, please attend at your convenience during the time designated. Project specific display posters will be staffed by Air Force representatives who will be available to answer questions. We encourage you to visit the project website at any time where you can preview all the materials that will be on display at the meetings. If you do not wish to attend an in-person meeting or are unable to do so, the project website provides a Virtual Meeting option that includes all of the same displays and information that will be available at the in-person meetings.

The environmental analysis for the EIS is being conducted by the Air Force Civil Engineer Center. Additional information on determining the potential effects to species protected by the Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act will be forthcoming as the analyses are completed. My point of contact for this consultation is Kevin Wakefield. He can be reached at (520) 228-4035, Kevin.Wakefield.1@us.af.mil. Please reach out should you have any questions.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Enclosures: 1. Project Area Map
2. In-person Public Meeting Locations and Schedule

New Mexico Historic Preservation Division
HPD Staff
Attn: Mr. Jeff Pappas, PhD
State Historic Preservation Officer and Director
407 Galisteo Street
Suite 236
Santa Fe, NM 87501

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Dr. Pappas,

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The environmental analysis for the Proposed Action is being conducted by the Air Force Civil Engineer Center. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs* and 36 CFR Part 800 of the National Historic Preservation Act, this letter requests consultation with your office regarding the Proposed Action. Additional information on determining the Area of Potential Effects, Identifying Historic Properties, and determining effects will be forthcoming as the analyses are completed. My point of contact for this consultation is Kevin Wakefield. He can be reached at (520) 228-4035, Kevin.Wakefield.1@us.af.mil. Please reach out should you have any questions.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

National Park Service
Regional Director, Intermountain Region
Attn: Ms. Sue Masica
National Park Service
12795 West Alameda Parkway
P.O. Box 25287
Denver, CO 80225

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Ms. Masica:

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Chief, Environmental

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

Arizona Department of Environmental Quality
Southern Regional Office
Attn: Mr. Misael Cabrera
400 W. Congress St
Suite 433
Tucson, AZ 85701

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Mr. Cabrera:

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

January 21, 2022

MEMORANDUM FOR STAKEHOLDERS

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

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Alternative 3 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except for increasing the size of Tombstone MOA/ATCAA by expanding the northern boundary. The subsonic floor of the Tombstone MOA would still be lowered to 100 feet AGL. Additionally, to increase the low-altitude airspace available to support Davis-Monthan AFB, the subsonic floor of Jackal MOA would be lowered to 100 feet AGL.

Alternative 4 - optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except that supersonic flight would be authorized down to 10,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

The DAF published a Notice of Intent to prepare the EIS in the Federal Register initiating the scoping phase of the project, which is the first opportunity for public and stakeholder involvement in the NEPA process. We request your participation and solicit your comments on the potential alternatives to the Proposed Action and information or analyses relevant to the Proposed Action. Please provide your comments no later than **March 4, 2022** to ensure consideration in the Draft EIS in accordance with 40 CFR 1503.3(b); comments submitted after this date shall be considered forfeited. Electronic comments may be submitted on the project website any time prior to the comment deadline, www.ArizonaRegionalAirspaceEIS.com. Written comments may be submitted at the in-person public meetings or by mailing to Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666 (must be postmarked by **March 4, 2022**).

The DAF is hosting several in-person public meetings to provide information on the proposed action and the preliminary alternatives described above. You are invited to attend any of the public meetings listed in Enclosure 2. All of the meetings will be open-house style at each location on the date and times indicated. No formal presentation will be given, please attend at your convenience during the time designated. Project specific display posters will be staffed by Air Force representatives who will be available to answer questions. We encourage you to visit the project website at any time where you can preview all the materials that will be on display at the meetings. If you do not wish to attend an in-person meeting or are unable to do so, the project website provides a Virtual Meeting option that includes all of the same displays and information that will be available at the in-person meetings. We look forward to your participation.

Enclosures: 1. Project Area Map
2. In-person Public Meeting Locations and Schedule

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	EPeters@ak-chin.nsn.us; RMiguel@ak-chin.nsn.us
Cc:	Dana Banwart; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject:	Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement
Date:	Thursday, January 20, 2022 9:04:28 AM
Attachments:	Ak-Chi[redacted]022.pdf

Greeting, the Department of the Air Force (DAF) would like to invite your tribe into Section 106 consultations. The following installations are participants in this consultation, Davis-Monthan Air Force Base (DMAFB), Luke Air Force Base (LAFB), and Morris Air National Guard Base (MANGB).

The DAF has determined that for the purposes of Section 106, the current project is an undertaking that should be subject to Section 106 analysis. Section 106 for the current project will be carried out in parallel to the NEPA process, and the results of Section 106 will inform the NEPA analysis. The DAF is soliciting any comments or concerns you may have at this time regarding the project, and is seeking any information you might be willing to share regarding properties of traditional or cultural significance that you feel should be considered in any analysis of the project. The DAF will continue Section 106 consultation with your tribe as more information becomes available regarding the finalized Area of Potential Effect (APE), DAF good faith efforts to identify historic properties within the APE, determinations of eligibility and effect, and any proposed mitigation for possible adverse effects.

The DAF Point of Contact for this project is Mr. Kevin Wakefield, EIAP Program Manager, at Davis-Monthan Air Force Base. Please send him your comments and concerns to 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035.
Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

DEPARTMENT OF THE AIR FORCE
355TH WING (ACC)
DAVIS-MONTHAN AIR FORCE BASE ARIZONA

January 10, 2022

Ak-Chin Indian Community
Attn: Mr. Robert Miguel
Chairman
42507 W. Peters & Nall Rd
Maricopa, AZ 85138

FROM: 355 WG/CC

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Mr. Miguel:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), the Department of the Air Force (DAF) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona. The DAF is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAA) to address training needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action is being jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for this consultation.

A MOA is a type of special use airspace with defined spatial boundaries within the National Airspace System designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers and low-altitude operations. ATCAAs are not special use airspace but can support the same training activities that occur in MOAs. An ATCAA exists in higher altitudes within the National Airspace System and can be requested by the military to extend the usable training airspace. ATCAAs typically have the same horizontal boundaries of the underlying MOA and an agreed upon ceiling.

Many of the Air Force managed MOAs available to aircrews in this region were first charted decades ago and have had minimal improvements over time to meet current and evolving training requirements. The DAF is proposing regional airspace modifications to address the training shortfalls caused by the insufficient existing special use airspace to include: changing the published times of use; adjusting the horizontal dimensions of one MOA; lowering the defined floor of some MOAs to allow for additional low-altitude training in the region; and adjusting the attributes of some airspace to allow for supersonic flight below 30,000 feet mean sea level and use of chaff and flares. The Proposed Action does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment. The special use airspace being addressed in the EIS includes several Air Force managed MOAs and their associated ATCAAs (named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby, and Fuzzy) located throughout Arizona and a small area of western New Mexico (see Enclosure 1).

The DAF is soliciting comments on three preliminary alternatives that would optimize the existing MOAs. The EIS will also evaluate a No Action Alternative per 40 CFR 1502.14 (Alternative 1). Alternative 2 includes all proposed modifications to fully optimize the MOAs/ATCAAs. Alternatives 3 and 4 are variations of Alternative 2. A summary of each of these is provided below, please visit the project website (www.ArizonaRegionalAirspaceEIS.com) for detailed information on these alternatives.

Alternative 1 (No Action) – airspace optimization would not occur. None of the existing MOAs/ATCAAs would be modified.

Alternative 2 – optimize Air Force managed MOAs/ATCAAs to address insufficient airspace capability and capacity for training aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB. Major actions would include: changing the published times of use for the MOAs to align with current training hours; increasing the size of the Tombstone MOA/ATCAA by moving the northern boundary approximately 10 nautical miles to the north and lowering the subsonic floor to 100 feet above ground level (AGL); lowering the subsonic floor of four MOAs to 500 feet AGL (Outlaw, Jackal, Bagdad and Gladden MOAs); authorizing the use of chaff in Tombstone MOA and lowering the altitude for releasing flares in Tombstone, Outlaw, Jackal, Bagdad, and Gladden MOAs; and authorizing supersonic flight down to 5,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

Alternative 3 – optimize Air Force managed MOAs/ATCAAs to address insufficient airspace capability and capacity. Major actions would include all of those listed for Alternative 2 except for increasing the size of Tombstone MOA/ATCAA by expanding the northern boundary. The subsonic floor of the Tombstone MOA would still be lowered to 100 feet AGL. Additionally, to increase the low-altitude airspace available to support Davis-Monthan AFB, the subsonic floor of Jackal MOA would be lowered to 100 feet AGL.

Alternative 4 - optimize Air Force managed MOAs/ATCAAs to address insufficient airspace capability and capacity. Major actions would include all of those listed for Alternative 2 except that supersonic flight would be authorized down to 10,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

The DAF is hosting open-house style public meetings at the locations, dates, and times listed in Enclosure 2. We would like to invite all members of your community to attend any of these meetings as part of the NEPA process. The project website (www.ArizonaRegionalAirspaceEIS.com) provides additional information on the proposal as well as a Virtual Meeting option for anyone that does not wish to attend a meeting in person.

We are requesting government-to government consultation with your community on preparation of this EIS, pursuant to Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, *Protection of Historic Properties*. The DAF is committed to sustained, meaningful and respectful consultation with federally recognized Indian Tribes. In accordance with the NEPA process, government-to-government consultation with federally recognized Tribal Nations is required per Executive Memorandum, April 29, 1994, *Government-to-Government Relations with Native American Tribal Governments*; Department of Defense (DoD) Instruction 4710.02: *DoD Interactions with Federally-Recognized Tribes*; and Department of Air Force Instruction (DAFI) 90-2002: *Interactions with Federally-Recognized Tribes.*

The DAF is requesting information on properties of religious and cultural significance to your Tribe. The DAF Point of Contact for this project is Mr. Kevin Wakefield, EIAP Program Manager, at Davis-Monthan Air Force Base. Please send him your comments and concerns to 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035. I look forward to receiving any input you may have regarding this endeavor. Thank you in advance for your assistance in this effort.

Sincerely,

TURNHAM.JOSEPH.CARY.1110826539
Digitally signed by TURNHAM.JOSEPH.CARY.1110826539
Date: 2022.01.19 09:43:25 -07'00'

JOSEPH C. TURNHAM, Colonel, USAF
Commander, 355th Wing

Enclosures: 1. Project Area Map
2. In-person Public Meeting Locations and Schedule

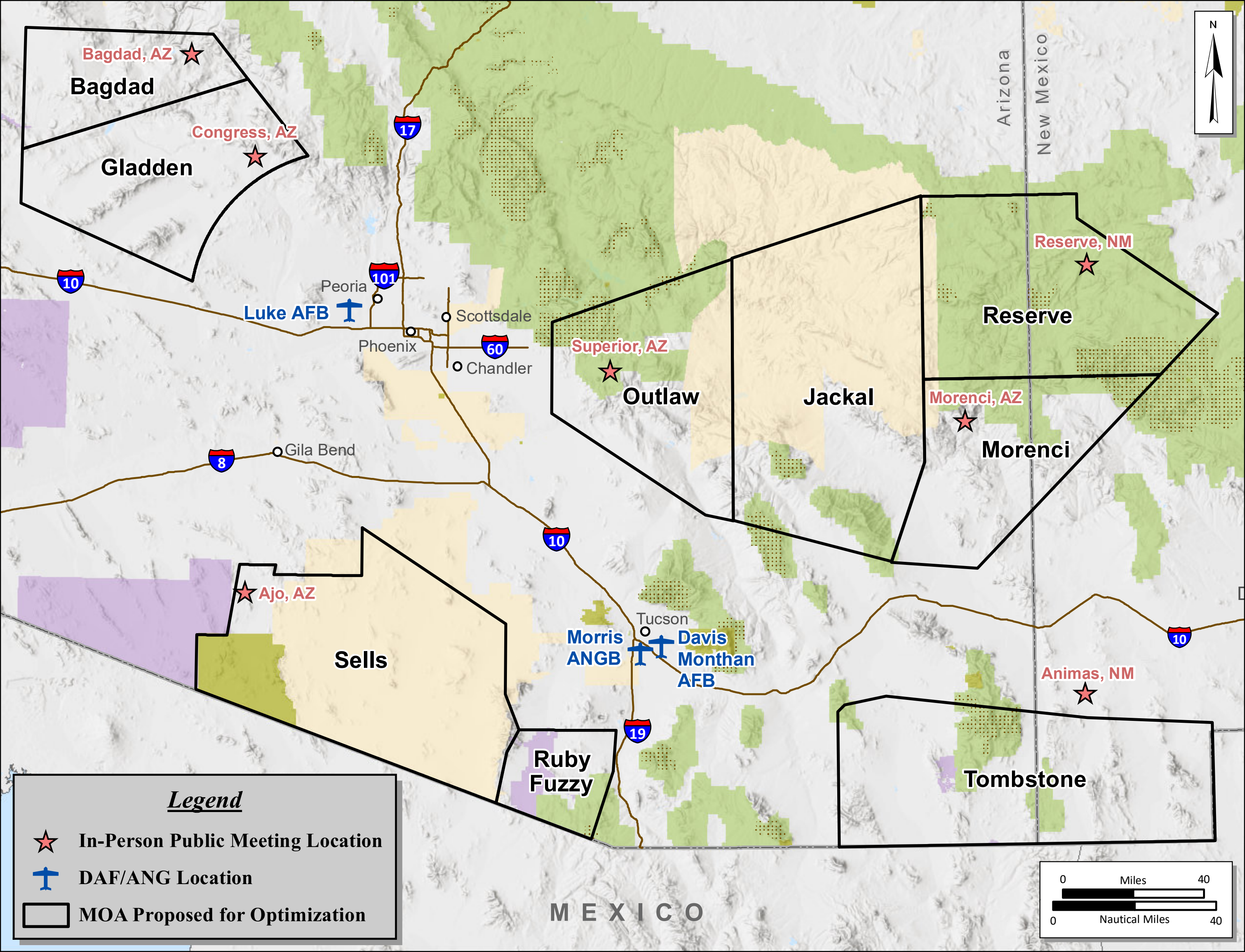
Sincerely,

Greg Kreuder
GREGORY KREUDER
Brigadier General, USAF
Commander, 56th Fighter Wing

Sincerely,

BUTLER.JEFFREY.L.1154525617 Digitally signed by BUTLER.JEFFREY.L.1154525617 Date: 2021.12.11 07:08:27 -07'00'

JEFFREY L. BUTLER
Brigadier General, AZ ANG
Commander, 162d Wing



Bagdad, AZ
Bagdad
Congress, AZ
Gladden
17
Arizona
New Mexico
N
10
101
Peoria
Luke AFB
Scottsdale
Phoenix
60
Chandler
Superior, AZ
Outlaw
Jackal
Reserve, NM
Reserve
Morenci, AZ
Morenci
8
Gila Bend
10
Ajo, AZ
Sells
Tucson
Morris ANGB
Davis Monthan AFB
10
Animas, NM
19
Ruby Fuzzy
Tombstone
Legend
In-Person Public Meeting Location
DAF/ANG Location
MOA Proposed for Optimization
MEXICO
0
Miles
40
0
Nautical Miles
40

Enclosure 2

In-Person Public Meeting Locations		
Date	**Time (Local)**	**Location**
Monday, February 7, 2022	5:00 – 7:00 pm	Sonoran Desert Inn & Conference Center 55 South Orilla Avenue Ajo, AZ 85321
Tuesday, February 8, 2022	5:00 – 7:00 pm	Superior Town Hall 199 N Lobb Avenue Superior, AZ 85173
Wednesday, February 9, 2022	5:00 – 7:00 pm	Bagdad Event Center 121 Main Street Bagdad, AZ 86321
Thursday, February 10, 2022	5:00 – 7:00 pm	Congress Fire Department 26733 Santa Fe Road Congress, AZ 85332
Tuesday, February 22, 2022	5:00 – 7:00 pm	Village Hall 15 Jake Scott Street Reserve, NM 87830-0587
Wednesday, February 23, 2022	5:00 – 7:00 pm	Clifton Community Center 100 North Coronado Blvd Clifton, AZ 85533
Thursday, February 24, 2022	5:00 – 7:00 pm	Animas High School 1 Panther Blvd Animas, NM 88020

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

2 May 2022

MEMORANDUM FOR ENVIRONMENTAL IMPACT STATEMENT FOR REGIONAL SPECIAL USE AIRSPACE OPTIMIZATION TO SUPPORT AIR FORCE MISSIONS IN ARIZONA

FROM: 355 CES/CEI

SUBJECT: Amended Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

1. On January 18, 2022, the Department of the Air Force (DAF) issued a Notice of Intent to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona (Vol. 87, No. 11 Federal Register, 2597, January 18, 2022). The Notice of Intent announced a 45-day formal scoping period through March 4, 2022, included the dates and locations of in-person scoping meetings, and solicited public comments on the DAF's proposed action. In response to public and stakeholder input received during the initial scoping period, the DAF has decided to extend the formal scoping comment period for this EIS.

2. The Amended Notice of Intent extends the formal scoping comment period through June 3, 2022 to allow additional time for the interested public to review the proposed action and submit scoping comments. No changes have been made to the proposed action. All handouts and displays are available on the project website (www.ArizonaRegionalAirspaceEIS.com). Comments submitted during the initial public scoping period from January 18 – March 4, 2022 are currently being reviewed and do not need to be resubmitted. Further comments can be provided through the project website and via mail to the address listed below:

Arizona Regional Airspace EIS
c/o Cardno
501 Butler Farm Rd., Suite H
Hampton, VA 23666

3. Further scoping comments are requested by June 3, 2022 to ensure full consideration in the Draft EIS.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

APPENDIX C
SAMPLE NEWSPAPER ADVERTISEMENT

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CLASSIFIED ADS

Classified ads cost $5 for the first twenty words plus 25¢ for each word over twenty. The classified deadline is noon on Monday (all other ads must be in by Friday). All out-of-town ads must be pre-paid.

Ajo Copper News
Phone 520-387-7688

YARD SALE

Multi-family yard sale – 427 W La Mina, Saturday, January 29. 8-12 p.m. See you there!

Fundraising yard sale happening February 4 and 5. Will be accepting donations for the sale. Please call (559) 470-7132. Will pick up donations. Proceeds go towards the Ajo Desert Haven Animal Clinic.

GAMES

Backgammon & Cribbage partner wanted – Play at the Plaza. Text first (928) 221-7826. Dan H.

HELP WANTED

Caregiver wanted – 4 hours/day M-F to help care for elderly mother, $13/hour; text or call Alexa (480) 376-4147.

Is your great little business idea planned-out and ready for some start-up money? Maybe I can help. 520-387-6770.

NOTICE

Al-anon meetings for family & friends of alcoholics. E. Coyote Howls RV Park-Why. Tuesday 11-12 p.m. November -March.

Open Alcoholics Anonymous meetings at the Federated Church (La Mina entrance) Mondays and Thursdays 7-8 p.m. For help or information please call Rick 520-387-4349.

Tehani Parker
Your storage unit is past due. It will be liquidated Feb. 1
PLEASE Contact NAPA

Ajo Public Schools
School Lunch

All lunches are served with fruit, juice, and milk.

Thursday, January 27
Pizza toast & marinara sauce, salad with ranch dressing, and carrots

Friday, January 28
Bean burritos, Spanish rice, and Mexican corn

Monday, January 31
Minestrone soup, baby carrots with ranch dressing, and bread sticks

Tuesday, February 1
Chicken patty, peas, mashed potatoes & gravy, and dinner roll

Wednesday, February 2
Corn dogs, French fries, and carrots

Breakfast is served before school in the morning.

Forms available

The Ajo Copper News has developed forms for items such as births, obituaries, engagements, weddings, and high school & college graduations. The staff then writes the article using the information listed on the form. They encourage the use of these forms because important information is less likely to be left out.

Other people prefer to try their hand at writing. These pieces are edited to fit standard newspaper format and style.

Forms may be picked up at the newspaper office at 10 Pajaro; requested by writing to the Ajo Copper News, PO Box 39, Ajo, AZ 85321; or requested by e-mail to *cunews@cunews.info* online. Fillable pdf forms may also be downloaded at http://www.cunews.info/NewsForms.html online.

Notice To Creditors/James C. Angleton
Jill D. Wiley, Esq. PCC #65073 SB #16824 jwiley@waterfallattorneys.com Law Offices Waterfall, Economidis, Caldwell, Hanshaw & Villamana, P.C. Williams Center, Suite 800 5210 E. Williams Circle Tucson, AZ 85711 (520) 790-5828 Attorneys for Personal Representative Superior Court Of Arizona, Pima County In the Matter of the Estate of: James C. Angleton, (DOB: August 17, 1944) Deceased. No. PB20220006 Notice To Creditors Notice Is Hereby Given that Courtenay Tessler has been appointed Personal Representative of this estate. All persons having claims against the estate are required to present their claims within four (4) months after the date of first publication of this notice or the claims will be forever barred. Claims must be presented by delivering or mailing a written statement of the claim to the Personal Representative at: Waterfall, Economidis, Caldwell, Hanshaw & Villamana, P.C. Attn: Jill D. Wiley, Esq. 5210 E. Williams Circle, Suite 800 Tucson, Arizona 85711. Dated this 14 day of Jan, 2022. /s/ Jill D. Wiley Attorney for Personal Representative
(Published January 26, February 2, 9, 2022)
MK -NTC-James C. Angleton 220126 J

Notice To Creditors Of Informal Probate Of Will And For Informal Apppointment Of Personal Representative (Testate Estate)/Anita Louise Beard Tifft
Paul B. Bartlett, P.C. 6135 E. Grant Road Tucson, Arizona 85712 Telephone: (520) 750-1061 results@court-rulings-only.com by Paul B. Bartlett State Bar No. 004514/PAN No. 3040 Attorney for Applicant, Meghan E. Tifft In The Superior Court Of The State Of Arizona In And For The County Of Pima In the Matter of the Estate of: Anita Louise Beard Tifft DOB: January 24, 1944 DOD: November 29, 2021 A deceased person. No. PB20220017 Notice To Creditors Of Informal Appointment Probate Of Will And For Informal Appointment Of Personal Representative (Testate Estate) Required by A.R.S.§ 14-3801 Notice Is Given That: 1. Personal Representative: Meghan E. Tifft and Casey Watson Tifft have been appointed Co-Personal Representatives of this Estate. 2. Deadline To Make Claims: All persons having claims against the estate are required to present their claims within four months from the date of the first publication of this Notice or the claims will be forever barred. 3. Notice Of Claims: Claims must be presented by delivering or mailing a written statement of the claim to the Personal Representative or attorney 6135 E. Grant Road, Tucson, AZ 85712. /s/ Paul B. Bartlett Attorney for Co-Personal Representatives, Meghan E. Tifft and Casey Watson Tifft 6135 E. Grant Rd. Tucson, AZ 85712
(Published January 26, February 2, 9, 2022)
MK -NTC-Anita Louise Beard Tifft 220126 J

Notice To Creditors Of Informal Probate Of Personal Representative (Intestate Estate)/John Maurice Stockham
Paul B. Bartlett, P.C. 6135 E. Grant Road Tucson, Arizona 85712 Telephone: (520) 750-1061 results@court-rulings-only.com by Paul B. Bartlett State Bar No. 004514/PAN No. 3040 Attorney for Personal Representative, Meghan Stockham In The Superior Court Of The State Of Arizona In And For The County Of Pima In the Matter of the Estate of: John Maurice Stockham DOB: June 9, 1964 DOD: November 18, 2019 A deceased person. No. PB20201579 Notice To Creditors Of Informal Appointment Of Personal Representative (Intestate Estate) Required by A.R.S.§ 14-3801 Notice Is Given That: 1. Personal Representative: Meghan Stockham has been appointed Personal Representative of this Estate. 2. Deadline To Make Claims: All persons having claims against the estate are required to present their claims within four months from the date of the first publication of this Notice or the claims will be forever barred. 3. Notice Of Claims: Claims must be presented by delivering or mailing a written statement of the claim to the Personal Representative or attorney 6135 E. Grant Road, Tucson, AZ 85712. /s/ Paul B. Bartlett Attorney for Personal Representative, Meghan Stockham 6135 E. Grant Rd. Tucson, AZ 85712
(Published January 26, February 2, 9, 2022)
MK -NTC-John Maurice Stockham 220126 J

Notice To Creditors/Ann M. Wilson
Law Offices Duffield Adamson & Helenbolt, P.C. 3430 E. Sunrise Drive, Suite 200 Tucson, Arizona 85718-3236 Tele: (520) 792-1181 Andrew Heideman aheideman@duffieldlaw.com State Bar #021127 / PCC #65521 Attorney for Personal Representative In The Superior Court Of The State Of Arizona In And For The County Of Pima In the Matter of the Estate of: Ann M. Wilson DOB: 10/06/1936 Deceased. No. PB-2022 0048 Notice To Creditors Notice Is Hereby Given that Martin J. Wilson has been appointed Personal Representative of this Estate. All persons having claims against the Estate are required to present their claims within four months after the date of the first publication of this notice or the claims will be forever barred. Claims must be presented by delivering or mailing a written statement of the claim to the Personal Representative or attorney at the address listed below. Dated: January 14, 2022 /s/ Andrew Heideman, Esq. 3430 E. Sunrise Drive, Ste. 200 Tucson, AZ 85718-3236
(Published January 26, February 2, 9, 2022)
MK -NTC-Ann M. Wilson 220126 J

Public Notices

PUBLIC NOTICE

The Air Force announces its intention to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona.

Proposed Action: The Air Force is proposing regional airspace modifications to alleviate training shortfalls and address evolving training needs for aircrews stationed at Davis-Monthan Air Force Base, Luke Air Force Base, and Morris Air National Guard Base in Arizona. The Proposed Action includes changing the times of use, modifying the horizontal and vertical dimensions, and adjusting the attributes of existing special use airspace to address training shortfalls caused by insufficient airspace. The modified airspace would support low-altitude training, low-altitude supersonic training, and use of chaff and flares. The Proposed Action does not include any changes at installations in Arizona (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the airspace, or weapons deployment. The airspace proposed for modification is located throughout southern Arizona and a small portion of western New Mexico.

Public Comments: The Air Force is soliciting comments on the potential alternatives to the Proposed Action and information or analyses relevant to the Proposed Action. Comments can be made at public meetings, submitted online at the project website (www.ArizonaRegionalAirspaceEIS.com), or by mailing to: Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666. To ensure full consideration of all comments in preparing the Draft EIS, comments should be submitted by **March 4, 2022**.

In-Person Public Meeting: An in-person public meeting in your area is identified below (please see website for full list of meetings). All meetings will be open-house style, there will not be a formal presentation, please attend at your convenience during the times listed. Air Force representatives will be available to answer questions about the proposal. For requests for sign language assistance at the meetings, contact Grace Keesling at (210) 925-4534. The Air Force requests that persons with hearing impairments notify them at least 7 days in advance of the meeting dates to ensure that sign language assistance can be available. Face coverings will be required to attend the meeting. Please check with the meeting venue or the project website for any last-minute changes or cancellations due to evolving covid restrictions.

February 7, 2022, 5:00 – 7:00 p.m.
Sonoran Desert Inn & Conference Center
55 South Orilla Avenue
Ajo, AZ 85321

Virtual Presentation: The project website provides a virtual presentation of the meeting materials for those persons that do not wish to attend or are unable to attend an in-person meeting.

NOTIFICACIÓN PÚBLICA

La Fuerza Aérea anuncia su intención de preparar una Declaración de Impacto Ambiental (EIS por sus siglas en inglés) para evaluar los posibles impactos ambientales de optimizar el espacio aéreo de uso especial disponible para apoyar las misiones de la Fuerza Aérea en Arizona.

Acción Propuesta: La Fuerza Aérea propone modificaciones del espacio aéreo regional para aliviar las deficiencias de entrenamiento y manejar las necesidades de entrenamiento en evolución para las tripulaciones aéreas estacionadas en la Base de la Fuerza Aérea Davis-Monthan, la Base de la Fuerza Aérea Luke y la Base de la Guardia Nacional Aérea de Morris en Arizona. La Acción Propuesta incluye cambiar los tiempos de uso, modificar las dimensiones horizontales y verticales, y ajustar los atributos del espacio aéreo de uso especial existente para manejar las deficiencias de entrenamiento causadas por el insuficiente espacio aéreo. El espacio aéreo modificado soportaría el entrenamiento a baja altitud, el entrenamiento supersónico a baja altitud y el uso de chaff y bengalas. La Acción Propuesta no incluye ningún cambio en las instalaciones en Arizona (personal, infraestructura, inventario de aeronaves u operaciones de aeródromos), en la alteración del suelo debajo del espacio aéreo o en el despliegue de armas. El espacio aéreo propuesto para la modificación se encuentra en todo el sur de Arizona y una pequeña parte del oeste de New México.

Comentarios del Público: La Fuerza Aérea está solicitando comentarios sobre las posibles alternativas a la Acción Propuesta e información o análisis relevantes para la Acción Propuesta. Los comentarios se pueden hacer en reuniones públicas, pueden ser enviados en línea en el sitio web del proyecto (www.ArizonaRegionalAirspaceEIS.com), o por correo a: Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666. Para garantizar la consideración completa de todos los comentarios en la preparación del Borrador del EIS, los comentarios deben enviarse antes del **4 de marzo de 2022**.

Reunión pública en Persona: A continuación, se identifica una reunión pública en persona en su área (consulte el sitio web para obtener una lista completa de las reuniones). Todas las reuniones serán de estilo abierto, no habrá una presentación formal, por favor asista cuando le resulte conveniente durante los horarios indicados. Los representantes de la Fuerza Aérea estarán disponibles para responder preguntas sobre la propuesta. Para solicitudes de asistencia en lenguaje de señas en las reuniones, comuníquese con Grace Keesling a (210) 925-4534. La Fuerza Aérea solicita que las personas con impedimentos auditivos les notifiquen al menos 7 días antes de las fechas de las reuniones para garantizar que la asistencia en lenguaje de señas esté disponible. Se requerirán cubiertas faciales (mascarillas) para asistir a la reunión. Consulte en el lugar de la reunión o en el sitio web en caso de haber cambios o cancelaciones de última hora debido a modificaciones en las restricciones por COVID.

7 de febrero, 2022, 5:00 – 7:00 p.m.
Sonoran Desert Inn & Conference Center
55 South Orilla Avenue
Ajo, AZ 85321

Presentación Virtual: El sitio web del proyecto proporciona una presentación virtual de los materiales de la reunión para aquellas personas que no deseen asistir o no puedan asistir a una reunión en persona.

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APPENDIX D2
SUBMITTED ALTERNATIVES, INFORMATION, AND ANALYSES

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APPENDIX D2: SUBMITTED ALTERNATIVES, INFORMATION, AND ANALYSES

for the

**ENVIRONMENTAL IMPACT STATEMENT FOR
REGIONAL SPECIAL USE AIRSPACE OPTIMIZATION
TO SUPPORT AIR FORCE MISSIONS IN ARIZONA**

United States Air Force Civil Engineer Center

August 2024

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TABLE OF CONTENTS

List of Figures

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1.0 SUBMITTED ALTERNATIVES, INFORMATION, AND ANALYSES

1.1 SUMMARY OF ALTERNATIVES SUBMITTED DURING SCOPING

The Department of the Air Force (DAF) evaluated comments and recommendations on the alternatives presented during scoping as well as new alternative recommendations that were submitted during the defined public and stakeholder scoping comment period. According to Council on Environmental Quality (CEQ) regulations detailed in 40 Code of Federal Regulations (CFR) 1508, reasonable alternatives must meet the purpose and need for the Proposed Action and be technically and economically feasible to implement. Some comments provided recommendations for additional alternatives or addressed components of alternatives. Where possible, these were incorporated into the alternatives analyzed in the Environmental Impact Statement (EIS). Others were eliminated from further evaluation because they do not meet the purpose and need of the Proposed Action and selection standards detailed in **EIS Section 1.4**. The following sections provide a summary of alternatives submitted during scoping and how they were evaluated for inclusion in the EIS. It should be noted that a number of suggestions were related to not making some or all of the proposed changes to the airspace size and attributes. The No Action Alternative is evaluated alongside the Proposed Action Alternatives.

1.1.1 Conduct Training in Another Location

A number of comments suggested the proposed training should be conducted at other locations including:

- Department of Defense (DoD) and government assets: Barry M. Goldwater Range (BMGR), Yuma Test Ranges, Chocolate Mountain Aerial Gunnery Range, White Sands Missile Range, Fort Bliss Training Center, Naval Air Station Fallon, Edwards Air Force Base (AFB), Fort Hood, Groom Lake, Playas Training and Research Center, Naval Air Weapons Station China Lake, Fort Irwin National Training Center, Sells Military Operations Area (MOA), Restricted areas (R2301W, R2301E, R2304, R2305)
- Other states or specific geographic location: Nevada, New Mexico, California, Texas, Florida, Mojave Desert, Death Valley, East of Flagstaff
- An allied country
- Over water: Pacific Ocean, Great Lakes

DAF evaluation:

The Proposed Action is driven by the need to provide training for aircrews near their home bases. Flying long distances limits training time and increases fuel consumption and cost. As stated in **EIS Section 1.4**, reasonable alternatives must provide suitable training airspace within 150 nautical miles of the bases. For this reason, allied countries as well as many of the other more distant locations suggested are not viable alternatives.

The Proposed Action would modify DAF-managed MOAs because aircrews cannot rely on the availability of another service's airspace. For this reason, use of airspace managed by other entities such as most of those recommended in the first bullet, is not a viable alternative. The DAF currently uses BMGR and the associated restricted areas (R2301, R2304, R2305) extensively for training. The use of these areas is discussed in **EIS Sections 1.1.4 and 1.3.2** of the EIS and the alternative to increase use of BMGR is specifically dismissed in **EIS Section 2.3**.

The Proposed Action is needed to provide realistic training over a variety of terrain. For this reason, training over water is not a viable alternative.

1.1.2 Alternatives to Piloted Aircraft Training

Some commentors suggested that the DAF utilize simulators for aircrew training or accelerate the transition from piloted to non-piloted aircraft and plan airspace needs accordingly.

DAF evaluation:

The purpose of the Proposed Action is to addresses shortfalls in existing MOAs to meet current aircrew training needs. As discussed in **EIS Section 2.3**, though simulators provide good skills training, they lack the realism and interoperability required for more advanced aircrew training. For these reasons, alternatives to piloted aircraft training are not viable alternatives.

1.1.3 Times of Use

Suggestions related to times of use of MOAs included: shorter times of use, no additional late-night hours, no weekend use, continue to use Notice to Air Missions (NOTAMs) without changing times of use, avoiding sunrise and sunset.

DAF evaluation:

In order to address the existing shortfalls of the MOAs, an objective of the Proposed Action is to adjust the published times of use to reflect the way the MOAs are currently used and would continue to be used. This includes use at night, dawn, and dusk to provide a variety of realistic training scenarios. Pilots are required to complete nighttime training which is challenging in the summer with many of the MOA hours ending before sunset. Currently, the nighttime training requires publishing NOTAMs which is an added administrative effort. Adjusting the published hours would allow this training to continue without the administrative burden of publishing NOTAMs. It should be noted, the proportion of day vs night sorties would not change under the Proposed Action (see **EIS Table 2.2-3**) but rather changing the published times would improve scheduling flexibility and provide consistency among contiguous MOAs. Having published times of use that align with how the MOAs are routinely used is safer than relying on NOTAMs. For these reasons, the suggested limitations on time of use are not viable alternatives.

1.1.4 Supersonic Flight

Comments related to alternative suggestions for supersonic flight include the following:

- Timing and altitude limitations: “awake times,” maintain the current 30,000-foot over the Fort Apache Indian Reservation; prohibit supersonic flight below 30,000 feet prior to 0800, prohibit supersonic flight below altitudes: 12,500 feet mean sea level (MSL), 18,000 feet MSL, 20,000 feet MSL
- Avoidances: prohibit supersonic flight within 15 miles of towns, cities, airports, and noise sensitive areas; no supersonic over Reserve or the Animas Valley

DAF evaluation:

As noted in **EIS Table 2.2-4**, supersonic flight is already authorized in eight of the 10 MOAs and Air Traffic Control Assigned Airspace (ATCAA), including during nighttime operations. As demonstrated in this table, there is no proposed change to the proportion of nighttime sorties and only a small change in the percentage of sorties that include supersonic flight (in Tombstone MOA, the Proposed Action would increase the percentage of sorties from 0 to 1 percent; in Outlaw/Jackal there is a proposed increase from 12 to 14 percent of sorties and in Gladden/Bagdad, an increase from 65 to 66 percent of sorties; other MOAs remain unchanged from the No Action Alternative). **EIS Table 2.1-3** includes existing and proposed altitudes for supersonic flight, already authorized to occur at 10,000 feet MSL in Bagdad, Gladden, and Sells MOAs, which are not proposed to change. Except when necessary for takeoff or landing, all flight, including supersonic flight, must adhere to minimum safe altitudes defined in 14 CFR 91.119 to avoid congested areas of a city, town, or settlement or any open-air assembly of people by 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft. This avoidance would not be relevant for supersonic flights since the lowest proposed altitude would be 5,000 feet AGL. Supersonic flight training at lower altitudes is required to address deficiencies in aircrew requirements for realistic training; therefore, timing and overarching altitude limitations are not viable alternatives.

1.1.5 Defensive Countermeasures

Comments provided the following suggestions for alternative scenarios to the Proposed Action's use of defensive countermeasures.

- Use chaff and flare only on military ranges
- Raise the altitude where live flares can be released
- Do not lower flare release altitude in Tombstone MOA (currently authorized at 5,000 feet above ground level [AGL], proposed at 2,000 feet AGL)
- Use "dummy flares"
- Include fire restrictions on flare use during high fire danger

DAF evaluation:

Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid detection or attack by enemy air defense systems and keep aircraft from being successfully targeted by weapons. When pilots detect threats from these weapons, they must respond instantly and instinctively using appropriate countermeasures. Pilots must become proficient at using these countermeasures through training to establish these critical response patterns. Restricted Areas designated above military ranges are used to segregate activities that could be hazardous to non-participating aircraft. Non-hazardous training, including operations that employ defensive countermeasures, occurs in MOAs. Currently, defensive countermeasures are used in all of the MOAs except for the Tombstone MOA, which is authorized for the use of flares, but not chaff. The Proposed Action includes lowering the minimum release altitude in five of the 10 MOAs to 2,000 feet AGL (from 3,000 and 5,000 feet AGL) (**EIS Table 2.2-5**), well above the altitude at which flares burn out. Lowering minimum release altitudes is a required change to address deficiencies in realistic aircrew training and to align with the proposed lower floors of the MOAs. For these reasons, limiting the use of countermeasures to restricted areas or military ranges and not lowering minimum release altitudes are not viable alternatives. The use of flares is defined in the training requirements in the Tactics, Techniques, and Procedures for each aircraft and requires the use of live flares to provide essential training realism. The use of dummy flares would not be authorized and would not be a viable alternative.

It is the responsibility of the Airspace Manager to develop a policy to ensure public and pilot safety during operations within Special Use Airspace (SUA). Implementing restrictions on the use of flares based on local fire conditions is a best management practice for each MOA and defined in individual unit policies. These restrictions are at the discretion of the Airspace Manager and vary depending on the local conditions beneath SUA. Use of the MOAs addressed in this EIS adhere to current best management practices to include restrictions on flare use to minimize the risk of fire, thus this recommendation is already included in the Proposed Action.

1.1.6 Altitude Restrictions

Alternatives related to the vertical dimensions of the MOAs included the following.

- Conduct all training above 20,000 feet
- Conduct subsonic training above 1,000 feet in Tombstone, Jackal, Outlaw, Reserve, and Morenci MOAs
- 10,000-foot ceiling for Outlaw
- Establish the floors of MOAs as “surface”
- Lower floors in MOAs (Sells, Bagdad, Gladden and others in Arizona) that have existing supersonic activity to 100 feet for subsonic, 5,000 or 10,000 feet for supersonic
- Altitude stratifications into High and Low to avoid disruption of civil aircraft operations
- Establish safe corridors from surface to 11,000 feet MSL for general aviation

DAF evaluation:

Conducting all training above 20,000 feet would not provide realistic aircrew training (see **EIS Section 1.3**, *Background* for a description of a realistic mission) and is not compatible with the purpose and need for the Proposed Action. No change is proposed to the floors of Reserve or Morenci MOAs under the Proposed Action or any of the alternatives; the floors of these MOAs are currently above the recommended 1,000 feet. The existing floor of Tombstone MOA is 500 feet AGL and the floors of Jackal and Outlaw MOAs are 3,000 feet AGL. The Proposed Action would lower the floors of these MOAs (**EIS Table 2.1-2**) to provide the volume of airspace required for realistic low-level aircrew training. In addition to the low-altitude airspace, the training also requires airspace at higher altitudes (up to Flight Level [FL] 180 and above), thus lowering the ceiling of Outlaw MOA is not a viable alternative. Also, the Outlaw ATCAA exists above the MOA (beginning at FL180) and is scheduled together to expand the volume of airspace available for training. Lowering the ceiling of the MOA would create a gap between the MOA and the ATCAA which would significantly hinder training activities within the airspace. Lowering the floors of the MOAs to the surface would significantly improve the quality of the training; however, DAF did not consider this a viable alternative given the potential negative impacts from this change. The Proposed Action and all alternatives include lowering the floors of the Bagdad and Gladden MOAs as recommended. The Proposed Action does not include any vertical changes to the Sells MOA.

Implementing altitude stratification into High and Low altitudes would not optimize the MOAs. The full volume of the MOA is needed to execute a variety of training scenarios that occur from low to high altitudes (see description of realistic mission in **EIS Section 1.3**). The DAF only schedules the altitudes that are needed for the specific training being performed with the remaining altitudes being released to the Federal Aviation Administration (FAA). Thus, altitude stratification is not a viable alternative.

It should be noted that Visual Flight Rules (VFR) traffic can access a MOA without restriction. The FAA has the authority to recall airspace if needed to route Instrument Flight Rules (IFR) traffic through a MOA for safety reasons. In addition, FAA Order JO 7400.2P, paragraph 25-1-6 allows nonparticipating IFR aircraft to transit an active MOA if there is a Letter of Agreement between the unit and the controlling agency. Therefore, establishing permanent corridors through the MOA is not necessary and would not be a viable alternative.

1.1.7 Avoidance of Specific Locations

A number of locations to be avoided by training flights or recommended routes were suggested including the following.

- Avoid Yarnell, Ajo, Portal, Paradise, Bisbee, Douglas, populated areas
- Fly in the corridor between Interstates 8 and 10
- Avoid Tribal lands, areas of cultural significance
- Avoid public lands including:
  - Wilderness Areas
  - National Parks
  - National Monuments
  - Conservation Areas
  - National Wildlife Refuges
  - Wild and Scenic Rivers
  - Areas of Critical Environmental Concern
- Avoid sensitive wildlife habitats and migration corridors, Chiricahua Mountains
- Avoid airspace including:
  - Existing emergency air travel routes
  - Military Training Routes (MTRs)
  - Higher floor near MTR IR250

DAF evaluation:

Congress has charged the FAA with administering all navigable airspace in the public interest as necessary to ensure the safety of all users of the airspace and the efficient use of such airspace. As a cooperating agency, the FAA provided consultation to the DAF in the development of the Proposed Action and alternatives to ensure compliance with airspace regulations. It should be noted that training within the MOAs must adhere to all standard aircraft safety procedures. This includes minimum safe altitudes and separation requirements to ensure airspace and public safety. Of particular interest would be rules defining aircraft right-of-way defined in 14 CFR 91.113, avoidance of noise sensitive areas or populated areas defined in 14 CFR 91.119, and recommendations defined in the FAA Aeronautical Information Manual (paragraph 7-5-6) which concerns National Parks, Monuments, Seashores, Lakeshores, Recreation Areas, and Scenic Riverways, National Wildlife Refuges, Big Game Refuges, Grame Ranges, and Wildlife Ranges, Wilderness Areas and Primitive Areas. In addition, medivac flights or life flights are always given the right-of-way in airspace, thus establishing permanent specific avoidance areas for existing emergency routes is not necessary.

Deconfliction for scheduling MTRs and MOAs that exist in the same space is done at the military unit level. When multiple military aircraft are operating in the same space (such as a MOA or MTR), they often have to operate in close proximity, and it may be impractical for air traffic controllers to ensure safe separation of the aircraft. Military Authority Assumes Responsibility of Separation of Aircraft are procedures used when military aircraft must operate under these conditions. Military Authority Assumes Responsibility of Separation of Aircraft procedures delegate the separation authority temporarily to the military authority operating the training flights. Thus, establishing avoidances of MTRs in the MOAs is not necessary and would not be a feasible alternative.

1.1.8 Tombstone Alternatives

Eliminate Tombstone A.

DAF evaluation:

The Proposed Action is to consolidate the existing Tombstone A, B, and C segments into one space with an exclusion area in the southwest corner. The Tombstone MOA is a vital component of pilot training in Arizona and removing a significant portion of this low-altitude training airspace would not meet the selection standard to improve low-altitude training in the area, thus eliminating Tombstone A is not a viable alternative.

1.1.9 Fuzzy MOA Alternative

Move the southern border of the Fuzzy MOA alternative to the north to avoid residents living below the existing southern portion of the MOA. Request related to times of use include leaving the start of the published time of use at 0700 during the winter (vs the proposed 0600 year round); leaving the end of the published time of use at 0900 (vs proposed 2400).

DAF evaluation:

The Proposed Action does not include any changes to the dimensions or altitudes of the Ruby and Fuzzy MOAs. See **EIS Section 4.1.3** for evaluation of alternatives recommending changes to the times of use. Fuzzy MOA is the smallest of the DAF-managed MOAs in the region and its southern border is consistent with the southern border of the Sells MOA. Moving the southern border of Fuzzy MOA without also moving the border of the connecting MOA would create a “shelf,” which hinders the training capacity of the airspace. Further reducing the size of this already small MOA would not optimize the airspace, thus it is not a viable alternative.

1.1.10 Outlaw, Jackal, Morenci, and Reserve MOA Alternatives

Outlaw MOA:

- Time of use – 0700–2000 Monday–Friday (0700–1800 Monday–Friday current, 0600–2200 Monday–Friday proposed)
- Vertical – lower to 1,000 and 2,000 feet (3,000 feet current, 500 feet AGL proposed)
- Flare release – no change
- Supersonic – 15,000 and 20,000 feet (30,000 feet MSL current, 5,000 feet AGL proposed)

Outlaw MOA

- Times of use – 0700–1800 Monday–Friday (as current; 0600–2200 is proposed)
- Vertical – no change
- Flare release – raise to 5,000 feet (3,000 feet existing; 2,000 feet proposed)
- Supersonic – above FL180 (30,000 feet MSL existing; 5,000 feet proposed)

Outlaw, Jackal, Morenci, and Reserve MOAs (entire complex)

- Times of use 0600–2200 Monday–Friday (this is as proposed)
- Minimum flare release – raise to 4,000 feet AGL (Outlaw, Jackal, Morenci) (existing 3,000 feet AGL in Outlaw and Jackal; 2,000 feet AGL in Morenci)
- Supersonic – 18,000 feet MSL; 30,000 MSL between 0600–0800 (existing is 30,000 feet MSL, proposed 5,000 and 10,000 feet AGL)
- Vertical changes:
    - Outlaw, Morenci, Reserve – no change
    - Jackal Low – 100 to 500 feet (this is as proposed)
    - Jackal MOA – 500 feet – FL180 (this is as proposed)

DAF evaluation:

Refer to **EIS Sections 4.1.3 and 4.1.4** for evaluation of recommendations for times of use and supersonic flight altitudes. The Proposed Action includes lowering the floor of Outlaw MOA to provide low-altitude training airspace to meet the selection standard to improve low-altitude training in the area, thus lowering the floor to 1,000 or 2,000 feet would not be a viable alternative.

1.1.11 Bagdad/Gladden MOAs Alternative

Rotate the Bagdad and Gladden MOAs 15 degrees to the west to avoid communities and schools.

DAF evaluation:

The Proposed Action does not include changes to the dimensions of the Bagdad or Gladden MOAs. There are two existing MOAs managed by the U.S. Marine Corps, the Turtle and Quail MOAs, located on the western side of the Bagdad and Gladden MOA complex which prevents rotation to the west as recommended (**Figure 1**). Thus, rotating the Bagdad and Gladden MOAs would not be a viable alternative.

Legend: MOA = Military Operations Area.

Figure 1 Aeronautical Chart for Bagdad, Gladden, Turtle, and Quail MOAs

1.1.12 Bagdad/Gladden, Tombstone, and Reserve MOAs Alternative

This alternative would limit low-level supersonic operations in Bagdad/Gladden, would not expand Tombstone MOA, and would not change the times of use for Reserve MOA (would remain by NOTAM).

DAF evaluation:

The Proposed Action does not include changes to supersonic operations in Bagdad/Gladden MOAs. This recommended alternative aligns with the No Action Alternative which is addressed in the EIS.

APPENDIX E
SUMMARY OF ALTERNATIVES

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Appendix E Summary of Alternatives

ALTERNATIVES

MOA	Attributes and *Operations* [1]	1 - No Action	2 - Proposed Action	3 - No Horizontal Expansion	4 - Limited Supersonic
Tombstone	Times of Use	0600-2100 M-F; other times by NOTAM	0600-2100 daily, other times by NOTAM	0600-2100 daily, other times by NOTAM	0600-2100 daily, other times by NOTAM
	Horizontal Dimensions	3,968 sqmi	4,766 sqmi	No change	4,766 sqmi
	Vertical Dimensions	A and B: 500 feet AGL to 14,500 feet MSL C: 14,500 feet MSL to FL180	Combine A,B,C: 100 feet AGL to FL180	Combine A,B,C: 100 feet AGL to FL180	Combine A,B,C: 100 feet AGL to FL180
	Chaff/Flare Authorization (minimum release altitude)	No/Yes (5,000 feet AGL)	Authorize chaff; 2,000 feet AGL minimum release	Authorize chaff; 2,000 feet AGL minimum release	Authorize chaff; 2,000 feet AGL minimum release
	Supersonic Authorization	30,000 feet MSL	5,000 feet AGL	5,000 feet AGL	10,000 feet AGL
	Annual sorties	3,450	+4,550 (8,000 total)	+3,450 (6,900 total)	+4,550 (8,000 total)
	Day/Night Percent	89 / 11	No change	No change	No change
	Percent Including Supersonic	0	1	1	1
	Chaff/Flare Annual Usage	0 / 16,240	7,000 / 30,000	5,810 / 24,900	7,000 / 30,000
Outlaw	Times of Use	0700-1800 M-F 1800-2200 M-F by NOTAM Intermittent weekends by NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM
	Horizontal Dimensions	2,627 sqmi	No change	No change	No change
	Vertical Dimensions	8,000 feet MSL or 3,000 feet AGL (whichever is higher) to FL180	500 feet AGL to FL180 ATCAA raised to FL510 by default[2]	500 feet AGL to FL180 ATCAA raised to FL510 by default	500 feet AGL to FL180 ATCAA raised to FL510 by default
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (3,000 feet AGL)	2,000 feet AGL minimum release	2,000 feet AGL minimum release	2,000 feet AGL minimum release
	Supersonic Authorization	30,000 feet MSL	5,000 feet AGL	5,000 feet AGL	10,000 feet AGL
	Annual sorties	5,190	+1,420 (6,610 total)	+2,520 (7,710 total)	+1,420 (6,610 total)
	Day/Night Percent	89 / 11	No change	No change	No change
	Percent Including Supersonic	12	14	14	14
	Chaff/Flare Annual Usage	17,690 / 19,050	24,560 / 26,460	25,750 / 31,560	24,560 / 26,460
Jackal	Times of Use	0700-1800 M-F 1800-2200 M-F by NOTAM Intermittent weekends by NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM
	Horizontal Dimensions	4,714 sqmi	No change	No change	No change
	Vertical Dimensions	Jackal Low: 100 feet AGL to 11,000 feet MSL or 3,000 feet AGL (whichever is higher) Jackal MOA: 11,000 feet MSL or 3,000 feet AGL (whichever is higher) to FL180	Low: 100 feet AGL to 500 feet AGL Jackal MOA: 500 feet AGL to FL180 ATCAA raised to FL510 by default	100 feet AGL to FL180 ATCAA raised to FL510 by defailt	Low: 100 feet AGL to 500 feet AGL Jackal MOA: 500 feet AGL to FL180 ATCAA raised to FL510 by default
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (3,000 feet AGL)	2,000 feet AGL minimum release	2,000 feet AGL minimum release	2,000 feet AGL minimum release
	Supersonic Authorization	30,000 feet MSL	5,000 feet AGL	5,000 feet AGL	10,000 feet AGL
	Annual sorties (used with Outlaw)	--	--	--	--
	Day/Night Percent	--	--	--	--
	Percent Including Supersonic	--	--	--	--
	Chaff/Flare Annual Usage	--	--	--	--
Morenci	Times of Use	0600-2100 M-F; other times by NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM
	Horizontal Dimensions	2,325 sqmi	No change	No change	No change
	Vertical Dimensions	1,500 feet AGL to FL180	No change	No change	No change
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (2,000 feet AGL)	No change	No change	No change
	Supersonic Authorization	30,000 feet MSL	5,000 feet AGL	5,000 feet AGL	10,000 feet AGL
	Annual sorties	3,350	+700 (4,050 total)	+700 (4,050 total)	+700 (4,050 total)
	Day/Night Percent	90 / 10	No change	No change	No change
	Percent Including Supersonic	11	No change	No change	No change
	Chaff/Flare Annual Usage	13,950 / 13,460	16,920 / 16,330	16,920 / 16,330	16,920 / 16,330
Reserve	Times of Use	By NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM	0600-2200 M-F, other times by NOTAM
	Horizontal Dimensions	3,348 sqmi	No change	No change	No change
	Vertical Dimensions	5,000 feet AGL to FL180	No change	No change	No change
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (5,000 feet AGL)	No change	No change	No change
	Supersonic Authorization	30,000 feet MSL	5,000 feet AGL	5,000 feet AGL	10,000 feet AGL
	Annual sorties (used with Morenci)	--	--	--	--
	Day/Night Percent	--	--	--	--
	Percent Including Supersonic	--	--	--	--
	Chaff/Flare Annual Usage	--	--	--	--
Bagdad	Times of Use	0600-1900 M-F; other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM
	Horizontal Dimensions	1,410 sqmi	No change	No change	No change

Appendix E Summary of Alternatives

ALTERNATIVES

MOA	Attributes and *Operations* [1]	1 - No Action	2 - Proposed Action	3 - No Horizontal Expansion	4 - Limited Supersonic
	Vertical Dimensions	7,000 feet MSL or 5,000 feet AGL (whichever is higher) to FL180	500 feet AGL to FL180	500 feet AGL to FL180	500 feet AGL to FL180
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (5,000 feet AGL)	2,000 feet AGL minimum release	2,000 feet AGL minimum release	2,000 feet AGL minimum release
	Supersonic Authorization	10,000 feet MSL	No change	No change	No change
	Annual sorties	6,920	+2,200 (9,120 total)	+2,200 (9,120 total)	+2,200 (9,120 total)
	Day/Night Percent	88 / 12	No change	No change	No change
	Percent Including Supersonic	65	66	66	66
	Chaff/Flare Annual Usage	14,390 / 15,570	19,050 / 20,610	19,050 / 20,610	19,050 / 20,610
Gladden	Times of Use	0600-1900 M-F; other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM
	Horizontal Dimensions	2,476 sqmi	No change	No change	No change
	Vertical Dimensions	7,000 feet MSL or 5,000 feet AGL (whichever is higher) to FL180	500 feet AGL to FL180	500 feet AGL to FL180	500 feet AGL to FL180
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (5,000 feet AGL)	2,000 feet AGL minimum release	2,000 feet AGL minimum release	2,000 feet AGL minimum release
	Supersonic Authorization	10,000 feet MSL	No change	No change	No change
	Annual sorties (used with Bagdad)	--	--	--	--
	Day/Night Percent	--	--	--	--
	Percent Including Supersonic	--	--	--	--
	Chaff/Flare Annual Usage	--	--	--	--
Sells	Times of Use	0600-1900 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM
	Horizontal Dimensions	4,854 sqmi	No change	No change	No change
	Vertical Dimensions	Low: 3,000 feet AGL to 10,000 feet MSL Sells: 10,000 feet MSL to FL180	No change	No change	No change
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (3,000 feet AGL)	No change	No change	No change
	Supersonic Authorization	10,000 feet MSL	No change	No change	No change
	Annual sorties	14,790	+3,020 (17,810 total)	+3,020 (17,810 total)	+3,020 (17,810 total)
	Day/Night Percent	85 / 15	No change	No change	No change
	Percent Including Supersonic	60	No change	No change	No change
	Chaff/Flare Annual Usage	31,490 / 34,560	37,890 / 41,580	37,890 / 41,580	37,890 / 41,580
Ruby	Times of Use	0600-1900 M-F; other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM
	Horizontal Dimensions	770 sqmi	No change	No change	No change
	Vertical Dimensions	10,000 feet MSL to FL180	No change	No change	No change
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (2,000 feet AGL)	No change	No change	No change
	Supersonic Authorization	Not authorized	No change	No change	No change
	Annual sorties	5,490	+2,120 (7,610 total)	+2,120 (7,610 total)	+2,120 (7,610 total)
	Day/Night Percent	90 / 10	No change	No change	No change
	Percent Including Supersonic	0	No change	No change	No change
	Chaff/Flare Annual Usage	20,890 / 20,770	28,450 / 28,280	28,450 / 28,280	28,450 / 28,280
Fuzzy	Times of Use	0700-1900 daily; other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM	0600-0000 M-F, other times by NOTAM
	Horizontal Dimensions	588 sqmi	No change	No change	No change
	Vertical Dimensions	100 feet AGL to 10,000 feet MSL	No change	No change	No change
	Chaff/Flare Authorization (minimum release altitude)	Yes/Yes (2,000 feet AGL)	No change	No change	No change
	Supersonic Authorization	Not authorized	No change	No change	No change
	Annual sorties (used with Ruby)	--	--	--	--
	Day/Night Percent	--	--	--	--
	Percent Including Supersonic	--	--	--	--
	Chaff/Flare Annual Usage	--	--	--	--

Notes **:**

[1] Annual sorties, breakdown of day/night sorties, percent of sorties that include supersonic, and chaff and flare usage are not attributes. Adjusting the attributes of the MOA determines the operations that can occur in that MOA.

[2] Outlaw and Jackal ATCAAs are defined in an LOA to FL510, but ceiling defaults to FL290 unless scheduled concurrently with Morenci and Reserve ATCAAs.

APPENDIX F
CHAFF AND FLARES

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1.0 INTRODUCTION

Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid detection or attack by enemy air defense systems and keep aircraft from being successfully targeted by weapons. When pilots detect threats from these weapons, they must respond instantly and instinctively using appropriate countermeasures. Pilots must become proficient at using these countermeasures through training to establish these critical response patterns.

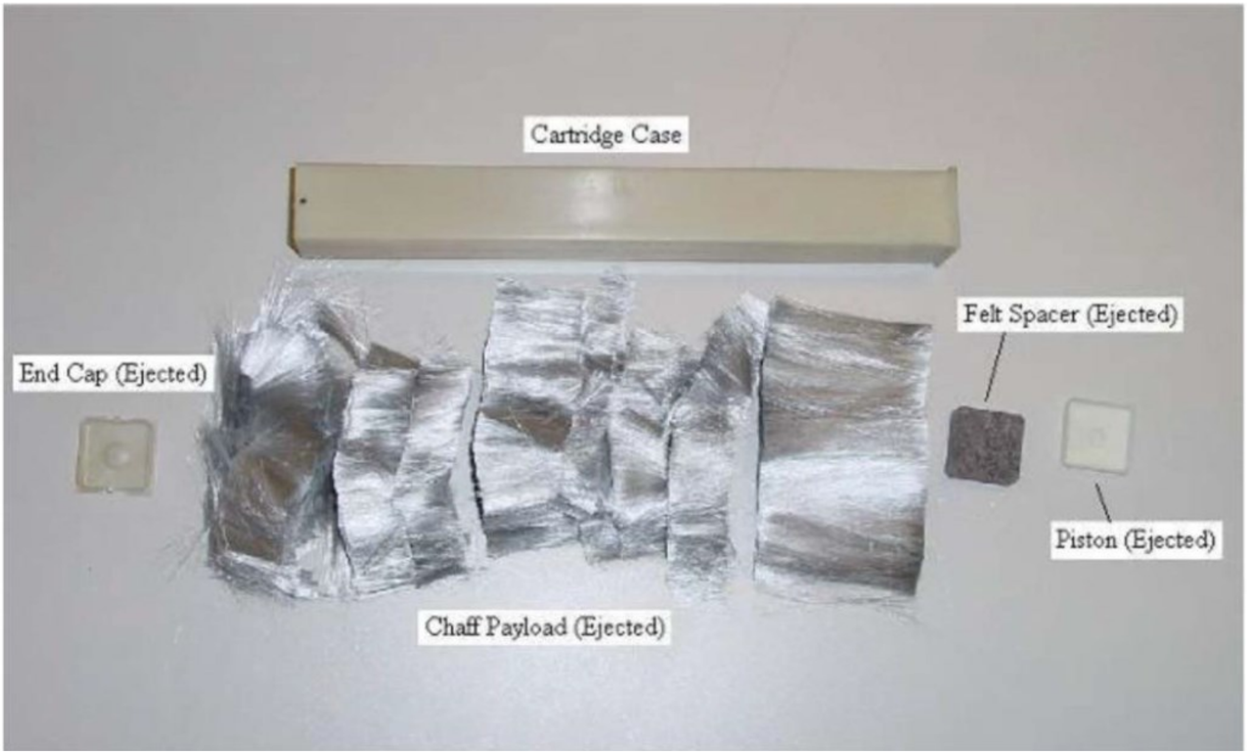
The effects of chaff and flares have been a point of public concern for many years; thus, several studies have been performed. The *Environmental Effects of Self Protection Chaff and Flares* was released in 1997 and was the culmination of 2 years of technical and environmental studies on the environmental effects of chaff and flares on various resources (Department of the Air Force [DAF] 1997). The *2011 Supplemental Report Environmental Effects of Training with Defensive Countermeasures* included relevant studies and technical papers prepared after the 1997 report. The supplemental report provides information on technological advancements in chaff and flares defensive countermeasures and considers the potential effects these changes could have on environmental analyses for Air Force training (DAF 2011). As part of the *Programmatic Environmental Assessment for Testing and Training with Defensive Countermeasures* (DAF 2023), an update to the 1997 and 2011 reports was developed and included as an appendix to that Environmental Assessment. The *2022 Supplemental Report Update: Environmental Effects of Training with Air Force Defensive Countermeasures* builds upon the two previous DAF reports to document the current and projected future defensive countermeasures used in DAF training, testing, and combat (DAF 2023).

This appendix provides detailed descriptions of the types of chaff and flares used within the airspace associated with the *Environmental Impact Statement (EIS) for Regional Special Use Airspace (SUA) Optimization to Support Air Force Missions in Arizona* and includes a discussion of the environmental impacts from training with chaff and flares. The information in this appendix summarizes the DAF 1997, 2011, and 2023 references; additional information about all types of chaff and flares can be found in those sources.

2.0 CHAFF

2.1 CHAFF CHARACTERISTICS

A bundle of chaff consists of approximately 5 to 5.6 million aluminum-coated silica fibers. When dispensed from aircraft, the fibers form an electronic “cloud” that breaks the radar signal and temporarily hides the maneuvering aircraft from radar detection. Chaff is designed to remain in the air long enough to confuse enemy radar. The chaff bundle is packed inside a 1-inch by 1-inch by 8-inch rectangular tube or cartridge. The cartridge remains in the aircraft after the chaff bundle is deployed. Each chaff bundle has a 1-inch by 1-inch felt spacer that falls to the ground along with two 1-inch square by 0.125-inch thick plastic end caps (**Figure 2-1**).



Note: The 8-inch cartridge (top of photo) remains on the aircraft when the chaff bundle is deployed. The chaff fibers (silver material in the center of the photo) disperse in the airstream and the individual fibers eventually settle on the ground surface. The white plastic end caps and the black felt spacer fall to the ground as residual material.

Figure 2-1 RR188 Chaff

The length of the chaff fibers, known as dipoles, determines the frequency range of the radio wave most effectively reflected by that particular dipole. Chaff fibers are cut to varying lengths to make them effective against the wide range of enemy radar systems that may be encountered. Since chaff is designed to obstruct radar, its use is coordinated with the Federal Aviation Administration (FAA). The type of chaff used in Arizona SUA is Radar Reflective (RR) 188. RR188 is training chaff that has D and E band dipoles removed to reduce interference with FAA radar (DAF 1997). Over 90 percent of all chaff used by DAF in all airspaces covering all environmental conditions including woodlands, desert, agricultural areas, oceans, grasslands, and wetlands is RR188. RR188 was included in the analyses in all the previous DAF reports (DAF 1997, 2011, and 2022).

2.2 Chaff Dispersion and Reliability

Chaff is ejected from an aircraft by a small pyrotechnic charge (chaff itself is not explosive) which pushes out the end cap followed by the chaff fibers and the piston. The chaff cartridge remains within the aircraft. When deployed, three to five chaff bundles may be ejected in rapid succession. Quality standards for chaff cartridges require that they demonstrate ejection of 98 percent of the chaff in undamaged condition, with a reliability rate of 95 percent at a 95 percent confidence level. However, to achieve the performance standards and not have an entire lot of chaff rejected, manufacturers typically set a mandatory standard of 99 percent reliability. The chaff must also be able to withstand a variety of environmental conditions that might be encountered during storage, shipment, and operation (such as high and low temperatures, vibration, altitude changes, humidity, etc.) (DAF 2022).

Once deployed, the “bundles” break apart and the light chaff continues to disperse and drift with prevailing winds. The chaff fibers can drift as far as 100 miles depending on the altitude of chaff release and local wind conditions (Arfsten et al. 2002). The chaff fibers eventually settle to the surface. Individual chaff fibers are approximately half the thickness of a very fine human hair and range in length from 0.3 to 1 inch or more. To put one strand of chaff in perspective, if a 1-inch-long strand of chaff were laid on this page, most readers would not be able to see the strand. Clumps of non-deployed chaff have been found on the ground at training ranges and on public or private property under airspace where chaff is used for training. However, assuming a 99 percent reliability rate and the large area covered by training airspace, encountering a clump of non-deployed chaff is rare. As an example, 20,000 chaff bundles deployed annually over a 2,000 square mile area would have an estimate of one clump of non-deployed chaff per 10 square miles per year (DAF 2022).

2.3 Chaff Components

Table 2-1 provides the components of chaff. The combined weight of chaff material is 3.35 ounces. Chaff strands are primarily silica and aluminum with a Neofat coating (stearic acid). Silica (silicon dioxide) belongs to the most common mineral group, silicate minerals. Silica is inert in the environment and does not present an environmental concern with respect to soil chemistry. Aluminum is the third most abundant element in the earth’s crust, forming some of the most common minerals, such as feldspars, micas, and clays. The chaff fibers’ anti-clumping agent, Neofat (90 percent stearic acid and 10 percent palmitic acid), assists with rapid dispersal of the fibers during deployment (DAF 1997). Stearic acid is a saturated fatty acid derived from animal and vegetable fats and oils and degrades when exposed to light and air (DAF 2011). Trace amounts of iron, copper, magnesium, and zinc have also been detected in the controlled combustion of chaff (DAF 1997).

Table 2-1 Components of RR188 Chaff

Component	Percent by weight
Silica Core	
Silicon dioxide	52-56
Alumina	12-16
Calcium Oxide and Magnesium Oxide	16-25
Boron Oxide	8-13
Sodium Oxide and Potassium Oxide	1-4
Iron Oxide	1 or less
Aluminum Coating	
Aluminum	99.45 minimum
Silicon and Iron	0.55 maximum
Copper	0.05 maximum
Manganese	0.05 maximum
Magnesium	0.05 maximum
Zinc	0.05 maximum
Vanadium	0.05 maximum
Titanium	0.03 maximum
Others	0.03 maximum

Source: DAF 1997, 2011, 2022.

2.4 Chaff Environmental Impacts

Issues have been raised by the public and agencies regarding the use of defensive countermeasures. The broad categories of these issues as well as specific questions about the use of chaff and effects on the environment are presented in DAF 2022. Additional sections in DAF 2022 review studies, research, and technological updates on chaff and provide responses to those representative questions. None of the studies demonstrated significant environmental effects from the use of training chaff as a defensive countermeasure as summarized in the following subsections. There is no risk of personal injury to any person on the ground from the highly unlikely scenario of being struck by a piece of falling residual material (see DAF 2022 for detailed analysis).

2.4.1 Soil, Water, and Air Quality Impacts

The principal components of chaff (i.e., aluminum, silica glass fibers, and stearic acid) do not pose an adverse risk to human and environmental health, based on the low-level toxicity of the components, their dispersion patterns, and the unlikelihood that the components would interact with other substances in nature to produce synergistic toxic effects (DAF 2011). The components of chaff are generally nontoxic except in exorbitantly large quantities that humans or wildlife would not encounter as a result of chaff use associated with the proposed operations.

The component of chaff that has the potential to affect soil or water chemistry is aluminum, which tends to break down in acidic and highly alkaline environments. Laboratory and field analyses referenced in DAF 1997 indicate that the pH of water in the soil or in a water body is the primary factor that determines the stability of the aluminum coating of chaff. The chaff fiber coating would be likely to release aluminum if the soil or water pH is less than 5.0 (extremely acidic) or greater than 8.5 (strongly alkaline). In semiarid conditions such as those found in much of the western United States (U.S.) and beneath the proposed airspace, soil pH tends to be neutral to alkaline and there is usually not enough water in the soils of this region to react with the aluminum. The low percentage of soils with a pH within the range to react with the chaff aluminum coating, in combination with the low soil water content, results in conditions that would be extremely improbable for detectable aluminum concentrations to be produced from chaff particles that weather on the ground (DAF 2011).

An impact to confined aquatic habitats could occur if there were a potential for significant accumulation and decomposition of chaff fibers. Since chaff would be broadly distributed with a low density in any one area, it is unlikely that chaff would be detectable or significantly accumulate within confined water bodies. Aluminum solubility is highly pH dependent. Water bodies in the western U.S. are neutral to slightly alkaline in pH (similar to soils) and are outside the pH range necessary to degrade the aluminum coating. Chaff particles that could fall on surface water would be chemically stable and subject to mechanical fragmentation. The potential toxicity of chaff was addressed in the 1997 Report (DAF 1997). Laboratory tests determined that the aluminum in water samples with pH 7 with a very high chaff-to-water ratio (1:20) was approximately one-sixth the freshwater acute value for aluminum and this level could not occur in the environment beneath the airspace where chaff is deployed (DAF 1997). No impact to water bodies would be anticipated, even in a highly unlikely event such as a clump of non-deployed chaff falling into a small, confined water body (DAF 2011). Aluminum is not known to accumulate to any great extent in most invertebrates under non-acidic conditions. It is unlikely that much, if any, of the aluminum present due to chaff use would be available for uptake by aquatic plants, fish, or other biota (DAF 2011).

A study conducted by the Desert Research Institute in 2002, *The Fate and Distribution of Radio Frequency Chaff* (Arnott et.al., 2002), and an independent parallel study conducted by B.W. Cook, *Investigation of the Abrasion, Fragmentation, and Re-Suspension of Chaff* (Cook 2002), addressed the concern of chaff fragmentation into inhalable particles (particulate matter 10 microns in diameter [PM_{10}] or smaller). Based on these studies it can be concluded that there is little to no risk of chaff abrading in the air to inhalable particles before being deposited on the ground. On the issue of fragmentation on the ground and re-suspension of inhalable particles, these two studies concluded that once chaff particles settle to the ground, they rapidly fragment and become indiscernible from ambient soil materials (DAF 2011).

2.4.2 Biological Resources Impacts

No toxicological effects from chaff on terrestrial organisms have been observed, even when subject to higher concentrations than would occur under normal training operations (DAF 2011). The chaff filament size is approximately 0.04 inch in diameter and 0.3 to 1 inch in length, and is thinner than human hair. As a result, chaff is too large for inhalation and rapidly breaks down in the environment. Because of the nature of disposition and the low rate of application and dispersal of chaff filaments during defensive training, wildlife and livestock would have little opportunity to ingest chaff filaments or residual materials (i.e., end caps). Arfsten et al. (2002) reviewed scientific data, both published and unpublished, and concluded that there are no data indicating that inhalation or ingestion of chaff or dermal contact with chaff causes any adverse health effects in humans. This conclusion is consistent with the fragmentation and resuspension studies noted in Section 2.4.1 (Desert Research Institute 2002; Cook 2002).

Wildlife do not use chaff fibers for food or nesting material and chaff is not known to be toxic to animals if ingested. Although some chemical components of chaff are toxic at high levels, such levels could only be reached through the ingestion of many chaff bundles or billions of chaff filaments. On the ground, chaff degrades over time to aluminum or silica particles that are indistinguishable from ambient soil materials. Chaff fragments do not display asbestos-like characteristics and do not pose asbestos-like health risks. The number of degraded or fragmented particles would be insufficient to result in disease (Spargo 1999; DAF 2011). Inhalation or ingestion of chaff filaments or fragments with adverse effects to wildlife, livestock, or humans is unlikely.

A 1972 study found no evidence of toxicity in calves fed chaff (DAF 2011). The study was unsuccessful in getting calves to eat chaff until the chaff was soaked with molasses. The study found no significant differences in the weight gain of calves given chaff versus the animals not given chaff. Similar studies in cattle and goats found no evidence that chaff ingestion posed a health hazard for farm animals (DAF 1997). Since chaff distribution is expected to be miniscule in any given location, adverse effects from chaff ingestion is not expected. Another concern of chaff that has been raised would be its effect on sheep's wool. In the unlikely event that chaff or residual materials had fallen on a sheep and remained in the wool, it is expected these items would be removed from the wool during the normal process to remove impurities prior to marketing the wool (DAF 2011).

Chaff fibers in an aquatic environment have not been found to significantly increase the concentration of any toxic aluminum constituents in sediments under airspace that has undergone more than 25 years of military operations deploying chaff. Concentrations of chaff in test environments were not found to result in a significant change in mortality to a variety of marine organisms in the Chesapeake Bay area. No effect was seen in marine organisms exposed to concentrations of 10 times and 100 times the expected environmental exposure. Marine and freshwater sponges normally create chaff-like spicules. Foraging species are exposed to and consume these spicules on a regular basis with no detrimental effect. Chaff release in airspace above an aquatic environment is not expected to affect a freshwater environment and is likely not discernible with the environment (DAF 2022).

2.4.3 Cultural Resource Impacts

An impact to cultural or historic resources could occur if chaff or chaff residual materials or an undeployed bundle of chaff altered the visual quality or had a physical or chemical impact that would alter the aesthetic setting of cultural resources. Chaff fibers are widely dispersed and rapidly degrade and are, therefore, not expected to be visible on cultural resources. If undistributed chaff fibers (i.e., a clump of chaff) were found, they may be mistaken for natural elements such as animal fur or plant material. The effect would be temporary, as fibers generally dissipate within a few days due to mechanical breakdown from wind, sediment erosion, and rain or snow. Chaff fibers are comprised of the naturally occurring aluminum and silica and would not have a chemical impact on cultural resources. Chaff residual materials fall to the ground with each deployed bundle of chaff and could land on structures or sacred sites but would not physically damage the site. The wide dispersion of chaff residual materials would reduce the likelihood of a piece being located in conjunction with a sacred site (see **Section 4.0** for residual material distribution). The appearance of a foreign object could be perceived as annoying to a visitor to such a site but would not be considered a significant impact to cultural resources or adversely affect a resources status on the National Register of Historic Places.

2.4.4 Airspace or Radar Safety Impacts

RR188 training chaff is the only type of chaff used in the Arizona SUA addressed in this EIS. This type of training chaff has dipole fibers removed, thereby eliminating interference with FAA radar tracking systems and has been approved for use by the FAA. Chaff can result in large targets on the radar display, and improved FAA radars permit differentiation of chaff from weather events. FAA directs air traffic controllers to issue notification of chaff areas where military training could interfere with operational use of radar for air traffic control. If training with chaff could potentially interfere with safe flight operations of commercial or general aviation radar, the training aircraft is requested to suspend use of chaff (FAA Order 7110.65Z).

There has historically been a concern that chaff particles suspended in weather systems could give inaccurate information regarding precipitation or severe weather conditions. Chaff may create electron interference and interfere with lightning strikes to the ground which may affect the projection of storm severity (U.S. General Accounting Office 1998). FAA has upgraded to Airport Surveillance Radar (ASR-11), which is an integrated primary and secondary radar system that has been deployed at terminal air traffic control sites. ASR-11 interfaces with both legacy and digital automation systems and provides six-level National Weather Service calibrated weather capability that provides enhanced situational awareness for both controllers and pilots.

3.0 FLARES

3.1 Flare Characteristics

There are four flare families used by the DAF: standard Magnesium/Teflon/Viton (MTV) flares, standard spectral flares, thrusted flares, and spectral decoys. Within the Arizona SUA, only MTV flares and spectral decoys are used. Refer to DAF 2022 for detailed descriptions of all flares, a summary of those used in Arizona is provided in the following sections.

3.1.1 MTV Flares

The standard MTV flare uses basic defensive flare technology to create a heat source that is hotter than an aircraft engine and is designed to draw an infrared (IR) missile toward the flare, or series of flares. These flares are primarily mixtures of magnesium and Teflon (polytetrafluoroethylene) with Viton (hexafluoropropenevinylidenefluoride copolymer) as a binder, molded into rectangular shapes (approximately 1-inch by 1-inch by 8 inches long). MTV flares are roughly 60 percent magnesium, 35 percent Teflon, and 5 percent Viton.

There are three types of ignition mechanisms for MTV flares: non-parasitic, parasitic, and semi-parasitic. Non-parasitic flares are discharged from the aircraft before ignition. The parasitic flare ignites inside the tube within the aircraft and is discharged already burning. The semi-parasitic flare is thrust out of the case by a firing mechanism and a Safe and Initiation (S&I) device permits the hot gases to ignite the flare pellet.

An individual flare weighs approximately 6.9 ounces. Typically, flares are wrapped with an aluminum-coated mylar or filament-reinforced tape (similar to duct tape) and inserted into an aluminum (0.03 inch thick) case that is closed with a felt spacer, a piston (typically made of plastic), a small plastic end cap, and the S&I device, if applicable. The aluminum case remains inside the aircraft once the flare is deployed.

Flares burn at a temperature in excess of 2,000 degrees Fahrenheit to simulate jet exhaust. MTV flares are designed to burn out within 500 feet from the time of release (generally 3 to 5 seconds) (DAF 2011). The burning magnesium flare pellet is completely consumed. The piston, end cap, felt spacers, and the S&I device (if applicable) fall to ground as residual materials along with what remains of the mylar wrapping depending on the extent to which the burning flare consumed the wrapper.

Most of the flares used in Arizona SUA are standard MTV flares: M-206 (non-parasitic), MJU-7A/B, and MJU-61A/B. MTV flares are the simplest and least costly flares available for training and have been in production for many years. The M-206 and MJU-7A/B flares accounted for 93 percent of all MTV flares deployed in DAF training airspace during 2020.

3.1.2 Spectral Decoys

IR missile seeker heads have become more capable in distinguishing a flare and the different spectral wavelengths associated with the target aircraft. The multiple variabilities in seeker heads required a different approach to defensive countermeasures and this resulted in the development of spectral decoys. Spectral decoys are a new type of flare that present a pyrophoric IR signature that is different from that of the MTV flares described above. The magnesium pellets in MTV flares combust to create an IR signature that interferes with the specific IR missile's seeker head. Spectral decoys are not pyrotechnic flares but are decoys with payloads comprised of thin iron foils with chemical pyrophoric coatings that oxidize when exposed to air, rather than a block of magnesium. They are generally the same size and shape as the MTV flares, approximately 1-inch by 1-inch by 8 inches long.

A spectral decoy is deployed by an electrical pulse passing through the countermeasure dispenser system to the impulse cartridge, which generates gasses and pushes the piston. The sealed end cap then releases, and the decoy assembly of pyrophoric coated foils is ejected from the aluminum case. When exposed to air, the thin foils react with the air to rapidly oxidize, generating an IR signature. After the reaction is completed, the oxidized foils, end cap, and piston fall to the ground as residual materials.

The foils in the spectral decoy do not burn like the magnesium pellet of the MTV flares, rather the foils oxidize when exposed to air. The foil oxidation generates heat of approximately 700 to 1,500 degrees Fahrenheit for a few seconds. The iron foils reach ambient temperature before they have drifted approximately 500 feet. The foils (approximately 0.75 inch by 0.75 inch) are stacked in groups inside the aluminum case. Each case varies from 1,500 to 3,000 foils. After the foils are deployed, they are distributed by the wind in a manner similar to chaff.

The spectral decoys used in Arizona SUA include MJU-64A/B and MJU-66A/B. Spectral decoys are much more expensive to produce than MTV flares, thus their use in training is limited.

A summary of the flare characteristics for those flares used in Arizona SUA is provided in **Table 3-1** followed by photos or schematics of each flare for reference (**Figures 3-1 through 3-5**).

Table 3-1 Flare Characteristics

Type	Approximate Size (inches)	Residual Materials	Weight of Piston (lbs)	Weight of S&I Device (lbs)	Estimated Number of Pyrophoric Foils
MTV Flares					
M-206	1 x 1 x 8	Wrap, felt spacer, piston, end cap (1 x 1 inch)	0.0044	n/a	n/a
MJU-7A/B	1 x 2 x 8	S&I, wrap, felt spacer, piston, end cap (1 x 2 inches)	0.0086	0.054	n/a
MJU-61A/B	1 x 1 x 8	S&I, wrap, piston, end cap (1 x 1 inch)	Included with S&I	0.054	n/a
Spectral Decoy (Pyrophoric)					
MJU-64A/B	1 x 1 x 8	Piston, disk, aluminum end cap (0.75 x 0.75 x 0.00125 inches), metal foil payload	0.02	n/a	3,000
MJU-66A/B	1 x 1 x 8	Piston, disk, aluminum end cap (0.75 x 0.75 x 0.00125 inches), metal foil payload	0.02	n/a	3,000

Source: Air Force 2011.

Figure 3-1 M206 Flare

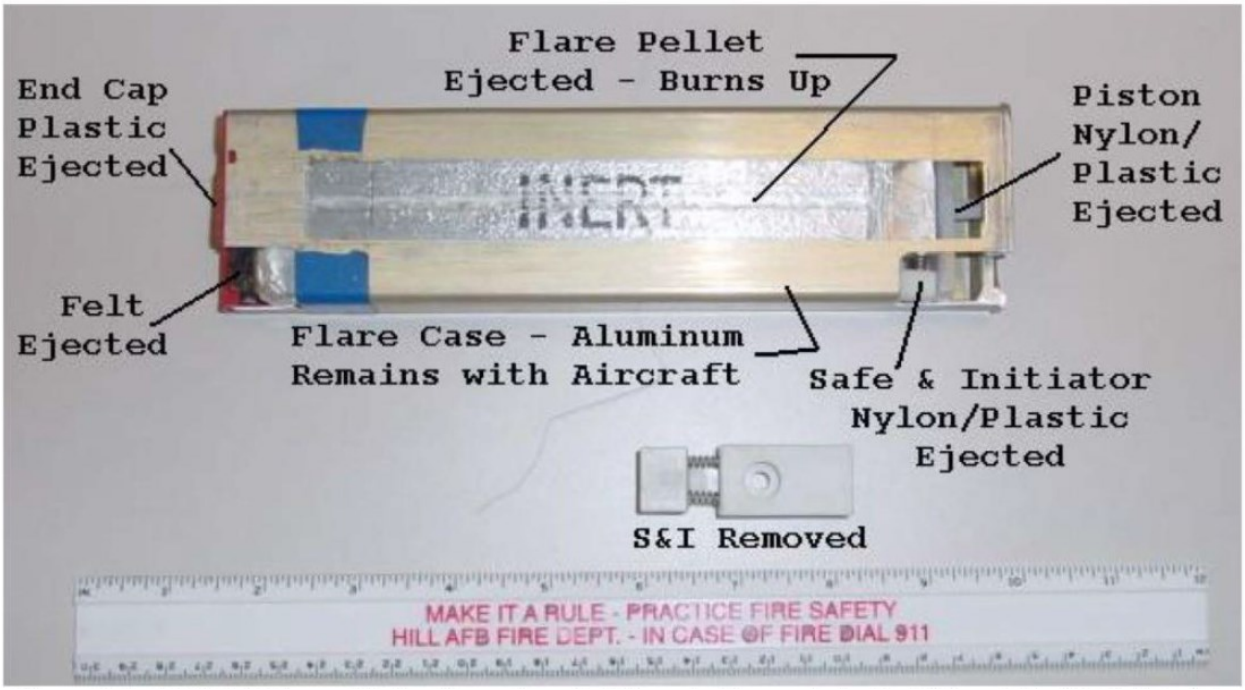


Figure 3-2 MJU-7A/B Flare (Aluminum Case Removed)

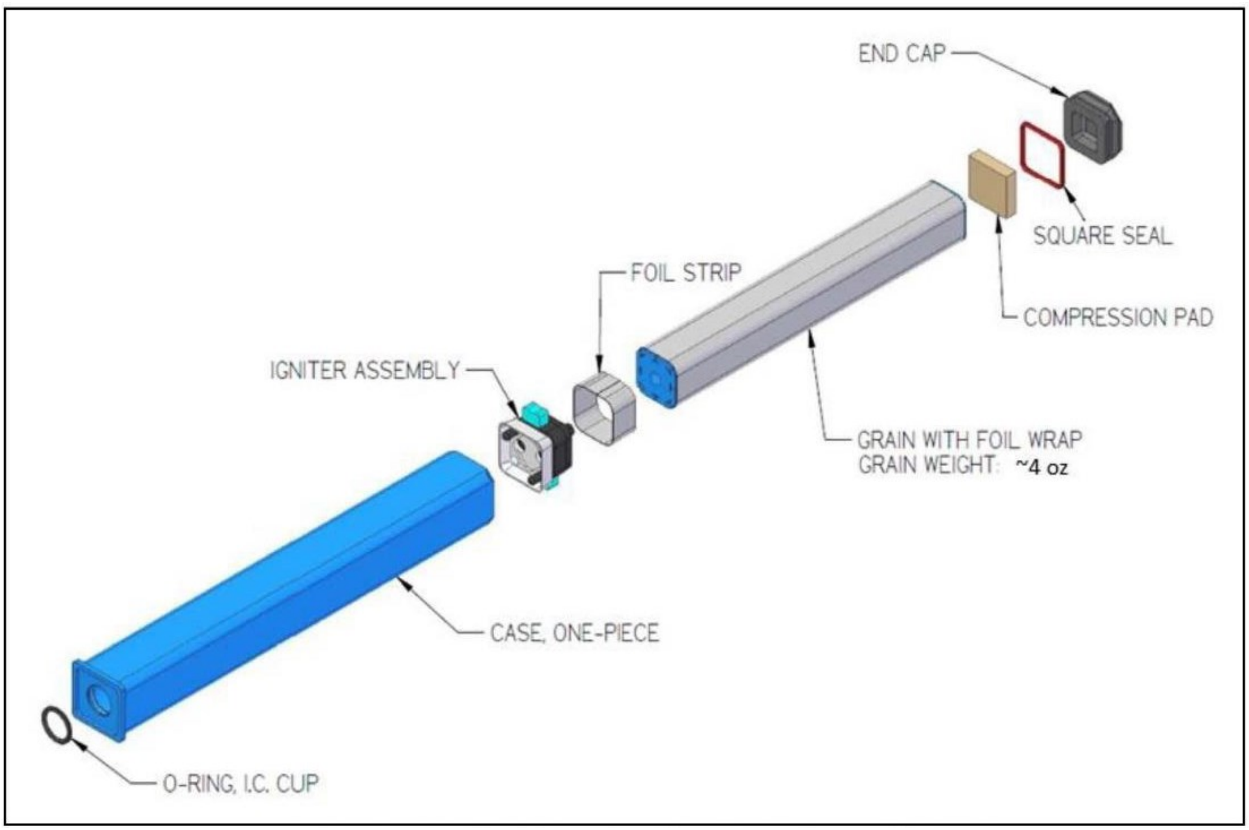


Figure 3-3 MJU-61A/B

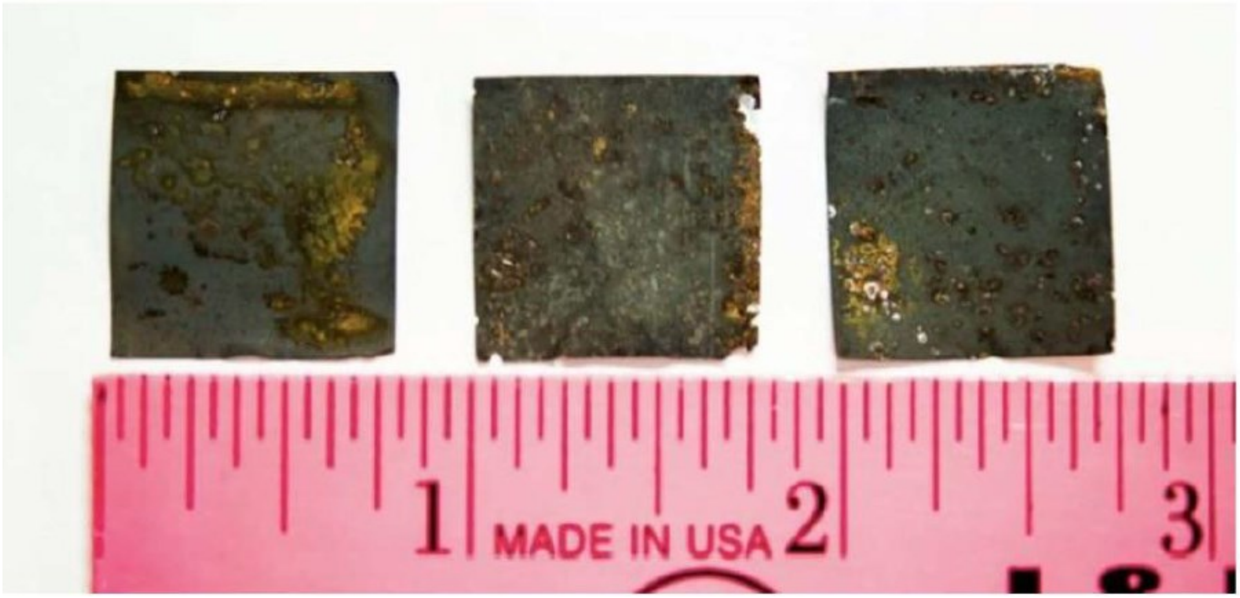
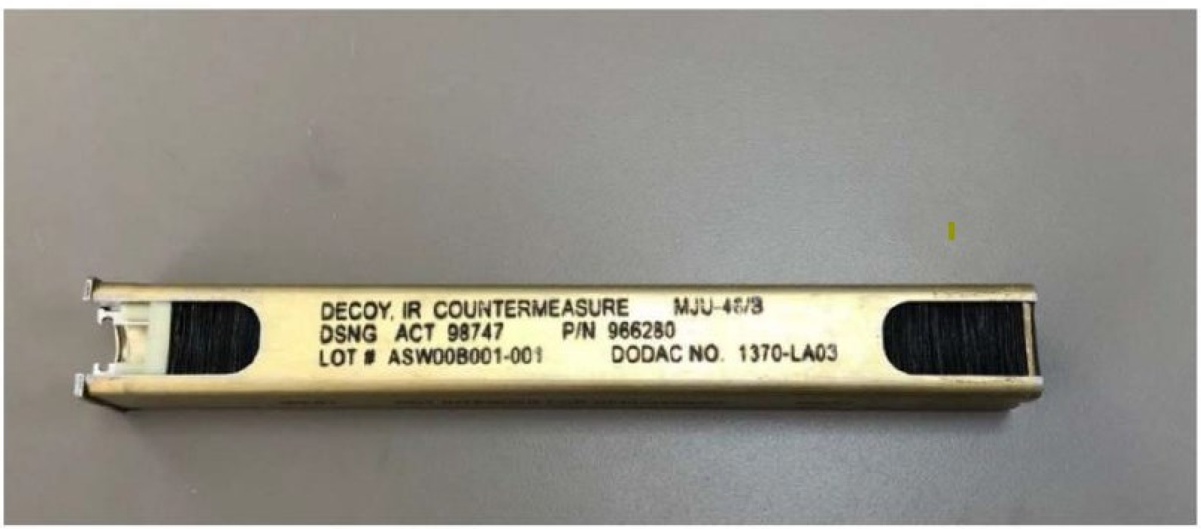


Figure 3-4 Pyrophoric Iron Foils After Deployment and Some Weathering



Note: The MJU-46/B pictured has the same shape and components as the MJU-64A/B and MJU-66.

Figure 3-5 MJU-64A/B or MJU-66

3.2 Flare Reliability

Flare reliability is critical since a flare failure could have a catastrophic effect on a targeted aircraft and create a significant safety concern for the pilot. Reliability is determined by testing the flares after manufacture. The reliability test examines the success of ignition and burn, pellet breakup, and indication of dispenser damage (DAF 2011). The flare procurement specifications require that a flare-manufactured lot of several thousand flares pass the ignition and ejection test where a random sample of 80 flares is drawn from the manufactured lot. The 80 flares are tested, and failure of 3 flares out of the 80 would result in the entire lot of several thousand flares being rejected (DAF 1997). Therefore, flares are designed and manufactured to a reliability rate of 99 percent with a 95 percent confidence level. Improper flare functioning could occur in approximately 1 percent of the flares. Improper functioning would be defined in one of four ways:

1. A flare is electrically triggered but does not release and does not burn. Such a flare would be treated as Unexploded Ordnance when the aircraft returns to the base and does not pose a safety or environmental concern.
2. A flare burned, but did not release from the aircraft. This would be a significant safety concern for the pilot and the aircraft. There is only one recorded case of this occurring in 1980 (DAF 2011). Reliability of flare ignition has been substantially improved since that time.
3. A flare released at too low an altitude or that did not burn correctly. If a burning flare struck the ground, it could result in a fire. The design, manufacturing, and testing process makes it extremely unlikely that a flare would burn for a period of time substantially longer than its design (3 to 5 seconds). It is possible for a pilot to accidentally release a flare lower than the approved altitude. A flare released lower than 500 feet above ground level (AGL) could still be burning when it struck the ground and result in a fire.
4. A dud flare would be one that was released but did not burn, either in whole or in part, and landed on the ground. If an unburned flare struck the ground, it would not burn unless subject to temperatures or friction generating temperatures in the one to two thousand degree range.

A dud flare on public or private land could be a safety concern. In an effort to determine the possibility of a dud flare, surveys were performed beneath active military ranges (Goldwater Range in Arizona and Utah Test and Training Range) on approximately 95 to 99 percent of the range area. In areas where approximately 200,000 flares had been deployed, an estimated 18 duds were found on the ground. This calculates to a ratio of approximately 1 in 10,000 (DAF 2011). Any dud flare found should be treated as Unexploded Ordnance.

DAF 2022 relied on source materials, DAF records, and other documentation that was not available for the 1997 and 2011 reports to conclude that 99.6 percent of training flares deploy, ignite, and burn correctly. The estimated percentage of unburned or dud flares, which annually fall to the surface under DAF training airspace *nationwide*, is calculated to be 0.4 percent or four (4) flares for every 1,000 flares deployed. Explosive Ordnance Disposal (EOD) records indicate that DAF EOD personnel recover an estimated one out of four dud flares.

3.3 Flare Environmental Impacts

Defensive flares are designed to protect an aircraft by diverting an attack from an IR missile that is guided toward the heat signature emitted by the target aircraft. A history of heat-seeking missiles and the importance of military training with defensive flares is provided in DAF 2022. Alternatives to the use of defensive flares have not had success, making the continued use and development of flare countermeasures crucial. Over the years, the capabilities of IR missiles have evolved, and the countermeasure design has evolved in response to the expanding IR missile capabilities. A summary of the environmental impacts associated with flare use is provided in the following subsections. For additional details, review the Programmatic Environmental Assessment for Testing and Training with Defensive Countermeasures (DAF 2023) and its Appendix A (DAF 2022).

3.3.1 Fire Safety Risk

Defensive countermeasures deployment in authorized airspace is governed by a series of regulations based on safety, environmental considerations, and defensive countermeasures limitations. These regulations establish procedures governing the use of flares over ranges and non-government owned areas. Flares are only used in approved airspace at altitudes designated for the airspace. The fire risk is directly associated to the release altitude; therefore, the risk of fire can be greatly reduced through establishing minimum altitudes for deployment of flares (DAF 2011).

Fire risk associated with flares stems from an unlikely, but possible, scenario of a flare reaching the ground or vegetation while still burning. If a flare struck the ground while still burning, it could ignite surface material and cause a fire. The approved altitude from which flares are dropped is regulated by the airspace manager and is based on a number of factors including flare burnout rate. Defensive flares typically burn out in 3.5 to 5 seconds, during which time the flare will fall between 200 and 400 feet (**Table 3-2).** The best way to reduce the risk of fires caused by flares is to establish and enforce minimum altitudes for flare release. Under this proposal, the minimum altitude for flare release would be 2,000 feet AGL which would result in flare burnout by 1,600 feet AGL.

Table 3-2 Flare Burnout Rate and Distance[1]

Time (in seconds)	Distance (in feet)
0.5	4.025
1.0	16.100
1.5	36.225
2.0	64.400
2.5	100.625
3.0	144.900
3.5	197.225
4.0	257.600
4.5	326.025
5.0[2]	402.500
5.5	487.025
6.0	579.600
6.5	680.225
7.0	788.900
7.5	905.625
8.0	1030.400
8.5	1163.225
9.0	1304.100
9.5	1453.025
10.0	1610.000

Notes: [1]Assumes zero aerodynamic drag and a constant acceleration rate of 32.2 feet per second.
[2]Defensive flares burn out within 3.5 to 5.0 seconds which would be within 400 feet of the flare release.
Source: DAF 2011.

Flare initiated fires would not be expected to occur although the use of flares minimally increases fire risk. Any fires of a natural or non-natural source may adversely affect vegetation, injure wildlife or livestock, and destroy property such as fences or buildings. If a wildland fire were to occur as a result of flare activity, a loss of canopy and/or understory vegetation would likely occur depending on the severity of the fire, land condition at the time, and how quickly fire control could respond. Recovery of the vegetation would depend on the species burned, season, and severity. Grasslands naturally have frequent fire regime, and therefore are composed of species that can quickly recover from fires. Woodland and shrubland communities recover over longer periods depending on severity of the fire and climatic conditions available following the fire.

A flare fire risk assessment using modeling software was reported in Environmental Effects of Chaff and Flares (DAF 1997) and the analysis in this document relies on the results of those studies. The probability of a single flare starting a fire cannot be predicted to any level of statistical significance, particularly since it would depend on so many variables as to be totally situationally dependent. If a burning flare reaches the ground or the canopy of a tree or shrub, it may or may not start a fire. The conditions that must be satisfied in order for a fire to start and spread include: (1) the source must be very near to or in contact with a fuel element, (2) the source must have sufficient residual energy to ignite the fuel element, and (3) fuel conditions must support the spread of fire. With regards to fires starting from a flare landing in the crown of a tree or shrub, a burning flare alighting in the crown layer of shrub cover may start a fire, but the crown layer must contain a sufficient density of dead foliage with low enough moisture content to support the spread of fire, or no fire would result. If hot material comes in contact with rotten wood, smoldering combustion can be sustained at temperatures as low as 200 degrees Celsius. However, the fraction of surface area covered by rotten wood is small in even in a decaying forest stand.

The probability of ignition given a hot inert item reaching the surface can be assessed based on the moisture content of "fuel" (vegetation and other combustible materials on the ground), which can be derived from local meteorological history and current conditions. The National Fire Danger Rating System uses these variables to calculate the fire hazards on a daily basis for the entire country. The system uses a selection of wildland fuel types that together can be used to characterize most forest and rangeland vegetation cover found in the continental U.S. The National Fire Danger Rating System is used primarily for pre-suppression planning over large geographic areas. The system's indices are sensitive to the phenology of vegetation communities; historical precipitation, temperature, and humidity; and current temperature, humidity, and windspeed. The DAF installations in Arizona use these daily ratings to determine if flares can be safely released in a specific MOA or if a constraint should be implemented. This way a balance can be struck between the risk of an unwanted fire start, possible consequences of an unwanted fire, and disruption of training operations. Suspending use of flares during high fire risk periods is an effective procedure at reducing fire risk (DAF 1997).

Fire management procedures and resources employed by land management agencies such as Bureau of Land Management, U.S. Forest Service, and state forests provide an effective and efficient means for the DAF to gauge when fire hazards may be too high to permit flare use. Because of the type of fire information required for fire hazard evaluation, risk assessments must be performed on a site-specific basis. Modeling a local fire hazard involves considerable data collection and effort; therefore, as a first step, guidelines already developed by land managers for an area can be adopted to determine when it is safe to drop flares. Fire prediction modeling would only need to be performed for areas where this approach is not adequate. Implementing the current flare restrictions used by the DAF installations has proven to be effective at preventing fires from training activities originating from the bases.

In a fire risk assessment for all DAF ranges and areas where flares are used (DAF 1997), operating parameters (such as release altitude, area, environmental conditions) were too diverse to isolate level of use as the only or primary factor affecting frequency of fires. For this reason, and because flare-caused fires were rare in any case, no statistical correlations could be made between utilization and fire occurrence.

Fire damages crops, rangelands, timber, and infrastructure. National grasslands, forests, and agricultural areas under airspace would be vulnerable to fire. Any potential loss of forage, livestock, or infrastructure due to fire could result in economic impacts to affected landowners. As such, Air Force Instruction 11-214 (22 December 2005) prescribes a minimum flare release altitude of 2,000 feet AGL over non-government-owned or controlled property minimizing the risk of flare caused fires.

3.3.2 Soil, Water, and Air Quality Impacts

The primary components of flare combustion are magnesium oxide, magnesium chloride, and magnesium fluoride. Magnesium oxide produces moderate toxic effects if directly ingested in large doses. The lethal oral dose in humans is estimated to be between 1 ounce and 1 pound. Additionally, occupational exposure studies have shown that magnesium oxide dust may cause metal fume fever (DAF 1997). Magnesium chloride, another component of flare combustion, is a naturally occurring salt and normally functioning kidneys can readily excrete magnesium ions after oral ingestion. The Occupational Safety and Health Administration standard for worker exposure for an hour time weighted average is 2.5 milligrams per cubic meter of air (DAF 1997). Another component of flares is oxygen difluorine. This compound is used in general as an oxidant in missile propellant systems. It is usually in a gaseous phase and is incompatible with numerous materials including metal oxides and moist air. Potential routes of exposure to humans and wildlife include inhalation and dermal contact. Toxic health effects as a result of direct exposure to large quantities of oxygen difluorine may include pulmonary edema, respiratory system irritation, and skin and eye burns (DAF 1997). However, due to the altitude of flare usage, these gases would be diluted and would not come into contact with residents or wildlife below the proposed airspace.

In the rare case of a dud flare reaching the ground, the components that have any potential to affect soil and water chemistry are minute quantities of chromium, magnesium, aluminum, boron, and barium (DAF 2011). Only magnesium and boron showed levels in sufficient concentrations for further evaluation in field and laboratory tests on flares (DAF 1997). Magnesium is an essential nutrient often found in nuts, seafood, and cereals and is a principal component of chlorophyll. Further laboratory and field tests found that only in extremely large quantities can magnesium affect water properties. Boron is both an essential and toxic element for plants. While large quantities of boron can be toxic under certain conditions, the quantities from flare combustion are too small to have a toxic effect (DAF 1997).

3.3.3 Biological Resources Impacts

Based on toxicological studies on flare residual materials, no chemical effects to biological resources would be expected. The small amount of magnesium dispersed from flares (as the combustion product magnesium oxide) would not result in levels that would be associated with acute exposure. In addition, there would be a minimal amount of flare ash residue produced by a deployed flare in the proposed airspace. As a result, the flare ash would be undetectable at any given location (DAF 2011).

Fires result in a loss of plant cover that could increase erosion and sedimentation downslope in some areas. Bare ground resulting from fires can allow the spread of invasive and non-native plant species such as annual grasses depending on the nature of the vegetation burned and the presence of invasive species in surrounding areas.

4.0 RESIDUAL MATERIALS

4.1 TOTAL RESIDUAL MATERIALS

Chaff and flares each contain benign components used in the packaging that ultimately fall to the ground as debris after released from the aircraft. These are referred to as “residual materials.” For chaff, the individual chaff strands, two plastic end caps, and the felt spacer (see **Figure 2-1**) fall to the ground as residual materials once the chaff is deployed. For flares, plastic end caps, felt spacers, piston, S&I device, and foils (for spectral decoy only) could potentially fall to the ground as residual materials (although sometimes these materials are partially or fully consumed during the flare ignition) (see **Table 3-1 and Figures 3-1 through 3-5**). The total annual residual materials associated with all the alternatives is provided in **Table 4-1** (Alternative 4 would have the same residual materials as Alternative 2). The number of chaff and flares are based on the annual sorties projected to occur within each airspace area by alternative.

Table 4-1 Total Annual Pieces of Residual Materials for All Alternatives

Airspace	Alternative 1 – No Action				Alternative 2 – Proposed Action and Alternative 4				Alternative 3			
	Chaff		Flares		Chaff		Flares		Chaff		Flares	
	Total Bundles	*Residual Materials*	*Total Cartridges*	*Residual Materials*	*Total Bundles*	*Residual Materials*	*Total Cartridges*	*Residual Materials*	*Total Bundles*	*Residual Materials*	*Total Cartridges*	*Residual Materials*
Tombstone	0	0	16,240	64,960	7,000	21,000	30,000	120,000	5,810	17,430	24,900	99,600
Outlaw/Jackal	17,690	53,070	19,050	76,200	24,560	73,680	26,460	105,840	25,750	77,250	31,560	126,240
Morenci/Reserve	13,950	41,850	13,460	53,840	16,920	50,760	16,330	65,320	16,920	50,760	16,330	65,320
Gladden/Bagdad	14,390	43,170	15,570	62,280	19,050	57,150	20,610	82,440	19,050	57,150	20,610	82,440
Sells	31,490	94,470	34,560	138,240	37,890	113,670	41,580	166,320	37,890	113,670	41,580	166,320
Ruby/Fuzzy	20,890	62,670	20,770	83,080	28,450	85,350	28,280	113,120	28,450	85,350	28,280	113,120

4.2 Residual Material Distribution

The use of chaff and flares would occur throughout the airspace and thus distribution of the individual pieces of residual materials would be huge, resulting in a miniscule amount of debris in any small geographic location. **Tables 4-2, 4-3, and 4-4** provide an estimate of the distribution of residual materials by alternative (Alternative 4 would have the same distribution as Alternative 2). As shown, the pieces of residual material per square mile for the Proposed Action would range from 20 pieces annually in Morenci and Reserve Military Operations Areas (MOAs), and up to 258 pieces annually in the Ruby and Fuzzy MOAs (**Table 4-3**). The Ruby and Fuzzy MOAs are the smallest MOAs; therefore, the concentration of residual materials would be highest in this area. Even in this small MOA, the use of chaff and flares could result in one piece of residual material per year in approximately 2.48 acres which would not be noticeable.

Table 4-2 Alternative 1 – No Action

Airspace	Estimated Pieces of Residual Materials			Airspace Area (square miles)	Pieces of Residual Material per square mile	Airspace Area (acres)	1 Piece per X acre
	Chaff	*Flares*	*Total*				
Tombstone	0	64,960	64,960	3,968	16	2,539,522	39.09
Outlaw/Jackal	53,070	76,200	129,270	7,341	18	4,698,243	36.34
Morenci/Reserve	41,850	53,840	95,690	5,673	17	6,360,723	66.47
Gladden/Bagdad	43,170	62,280	105,450	3,886	27	2,487,042	23.59
Sells	94,470	138,240	232,710	4,854	48	3,106,562	13.35
Ruby/Fuzzy	62,670	83,080	145,750	770	189	492,800	3.38

Table 4-3 Alternative 2 – Proposed Action and Alternative 4

Airspace	Estimated Pieces of Residual Materials			Airspace Area (square miles)	Pieces of Residual Material per square mile	Number of Additional Pieces per square mile Compared to No Action	Airspace Area (acres)	1 Piece per X acre
	Chaff	*Flares*	*Total*					
Tombstone	21,000	120,000	141,000	4,766	30	13	3,050,242	21.63
Outlaw/Jackal	73,680	105,840	179,520	7,341	24	7	4,698,243	26.17
Morenci/Reserve	50,760	65,320	116,080	5,673	20	4	6,360,723	54.80
Gladden/Bagdad	57,150	82,440	139,590	3,886	36	9	2,487,042	17.82
Sells	113,670	166,320	279,990	4,854	58	10	3,106,562	11.10
Ruby/Fuzzy	85,350	113,120	198,470	770	258	68	492,800	2.48

Table 4-4 Alternative 3

Airspace	Estimated Pieces of Residual Materials			Airspace Area (square miles)	Pieces of Residual Material per square mile	Number of Additional Pieces per square mile Compared to No Action	Airspace Area (acres)	1 Piece per X acre
	Chaff	*Flares*	*Total*					
Tombstone	17,430	99,600	117,030	3,968	29	13	2,539,522	21.70
Outlaw/Jackal	77,250	126,240	203,490	7,341	28	10	4,698,243	23.09
Morenci/Reserve	50,760	65,320	116,080	5,673	20	4	6,360,723	54.80
Gladden/Bagdad	57,150	82,440	139,590	3,886	36	9	2,487,042	17.82
Sells	113,670	166,320	279,990	4,854	58	10	3,106,562	11.10
Ruby/Fuzzy	85,350	113,120	198,470	770	258	68	492,800	2.48

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APPENDIX G
CUMULATIVE ACTIONS

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Table 1 Past, Present, and Reasonably Foreseeable Actions within the ROI for Proposed Airspace Optimization			
Action	**Description**	**Contribution to Cumulative Effects**	**Resources Affected**
Department of Defense Actions			
F-35A Training Basing EIS (DAF 2012)	Proposed beddown of F-35A training mission at one or more of four locations. Luke AFB was selected for beddown. Currently 2 of the 4 planned squadrons are stationed at Luke AFB.	The F-35A currently operates within the ROI and will continue to do so once all squadrons are located at Luke AFB. The current and anticipated future operations of all F-35s have been accounted for in the operations and analysis for all the Alternatives, including the No Action Alternative. Since these operations are accounted for in the analysis, there would be no cumulative effect.	None
CATEX for Jackal/Outlaw/Reserve/Morenci ATCAA Supersonic Operations (DAF 2019)	Proposed supersonic operations above FL300 in Jackal/Outlaw/Reserve/Morenci MOAs. Up to 99 F-16 sorties per day/40 seconds per sortie; 100 F-35 sorties per day/1 min per sortie. Supersonic operations would be straight, level, or combat maneuvering segments above FL300 with a target Mach to be 1.2M.	The supersonic operations within the Jackal, Outlaw, Reserve, and Morenci ATCAAs are accounted for in the No Action Alternative analysis for noise. With the proposed change to lower the authorized altitude for supersonic flights to 5,000 feet AGL or 10,000 feet AGL, the supersonic flights within the ATCAA may continue but would not be additive. There would be no cumulative effect.	None
EA for Personnel Recovery Training Program (DAF 2020)	Proposed action is to conduct an improved comprehensive Personnel Recovery training program centered out of Davis-Monthan AFB. Training operations would occur throughout the southwestern U.S. in Arizona, California, Nevada, and New Mexico. Action included using DoD and non-DoD properties for ground, flight, and water operations. The Personnel Recovery comprehensive training involves ground, water, and flight/airspace activities. The training includes large force exercises biannually that last for approximately 3 weeks, quarterly medium force exercises that last two weeks, and small force daily activities.	Personnel Recovery training activities could occur within Tombstone, Jackal, Outlaw, Morenci, and Reserve MOAs. The large force and medium force exercises would be infrequent events that would likely displace or eliminate normal daily operations within these MOAs. The analysis of the Proposed Action includes not only transient aircraft operations but also a 10 percent increase to account for annual fluctuations in operations and to provide scheduling flexibility for training events such as this or other unforeseen training needs. There would be no cumulative effect.	None

Table 1 Past, Present, and Reasonably Foreseeable Actions within the ROI for Proposed Airspace Optimization			
Action	**Description**	**Contribution to Cumulative Effects**	**Resources Affected**
CATEX for Dedicated Contract ADAIR Support at Luke AFB (DAF 2022)	Up to 12 contractor-owned aircraft and no more than 60 maintainers and 11 pilots would beddown at Luke AFB. These aircraft would provide adversary air support for F35 training. Dedicated contract ADAIR would free up military resources currently used to self-generate ADAIR. Contract ADAIR aircraft (expected to be an F-1 or F-16) would fly an estimated 3,130 sorties from Luke AFB. This proposed number of sorties would not exceed the total annual airfield operations assessed in the F-35 Beddown EIS (DAF 2012).	ADAIR support would occur in all airspace used by the F-35 to include: Bagdad, Gladden, Sells, Ruby, Fuzzy, Jackal, Outlaw, Morenci, and Reserve MOAs. All of the F-35 operations have been accounted for in the No Action and all alternative analyses in this EIS. There would be no cumulative effect.	None
CATEX for Belgian Beddown at Luke AFB (DAF 2022)	Belgian F-35s would beddown at Luke AFB from 2023 through 2030 under the Foreign Military Sales Program at the installation. This action includes 119 total personnel to be positioned at Luke AFB for the interim. The beddown includes eight aircraft. The airfield operations associated with the Belgian Air Force would not represent an increase in the total airfield operations analyzed under the F-35 Training Basing EIS (DAF 2012).	Belgian F35s would occur in all airspace used by the Luke F-35s to include: Bagdad, Gladden, Sells, Ruby, Fuzzy, Jackal, Outlaw, Morenci, and Reserve MOAs. The operations associated with the Belgian F35s would not exceed those analyzed in the F-35 Training Basing EIS. All of the F-35 operations have been accounted for in the No Action and all alternative analyses in this EIS. There would be no cumulative effect.	None
4th Generation Missions Regional Realignment proposed for Davis-Monthan AFB in Tucson AZ (DAF 2023)	This action would relocate several squadrons from Nellis AFB to Davis-Monthan AFB and make adjustments to some of the existing units already stationed at Davis-Monthan AFB, and would result in an increase of 18 HH-60G aircraft stationed at Davis-Monthan AFB.	The helicopters that would be stationed at Davis-Monthan would use Tombstone, Jackal Low, Morenci, and Fuzzy MOAs. The operations are accounted for in the Other Local and Transient categories for noise and airspace. But these low-flying units would cumulatively contribute to Air Quality.	Air Quality
EA for Playas Special Use Airspace (DAF 2021)	An EA and FONSI was issued for the proposal to establish the temporary Playas MOA/ATCAA as a permanent MOA/ATCAA. The MOA exists from 300 feet AGL up to FL180 with an ATCAA above to FL230.	The Playas MOA overlaps the proposed expanded Tombstone MOA. Under Alternatives 2 and 4, the southern half of the Playas MOA would overlap or be consumed by the Tombstone MOA. The DAF would be responsible for deconflicting schedules for both of these MOAs.	Airspace Management Noise

Table 1 Past, Present, and Reasonably Foreseeable Actions within the ROI for Proposed Airspace Optimization			
Action	**Description**	**Contribution to Cumulative Effects**	**Resources Affected**
EIS for 492 Special Operations Wing Beddown (under development)	An EIS is under development for proposed consolidation of Air Force Special Operations Command (AFSOC)'s third power projection wing and all mission capabilities (strike, mobility, ISR, air/ground integration) at Davis-Monthan AFB. Action would include relocation of AFSOC assets including aircraft and personnel from multiple locations to Davis-Monthan AFB.	The timeline for beddown and changes to the aircraft inventory at Davis-Monthan AFB are not yet known, however, the beddown would not affect the proposed airspace modifications being addressed in this EIS nor would it negate the requirement for these modifications. Aircraft associated with AFSOC would also have a requirement to train. There are no airspace modifications proposed in the beddown EIS. The analysis in this EIS includes a modest increase in operations to account for year-to-year fluctuations and variations of use throughout the MOAs. It is expected that AFSOC use of the airspace would be similar to existing users and not present a cumulative effect.	None
A-10 Divestiture at Davis-Monthan AFB (under development)	DAF announced divestiture of A-10s across the DAF including the inventory at Davis-Monthan AFB. The DAF plans to retire the A-10 fleet starting in the Fall of 2024 through the next decade. The aging fleet would be replaced by a more advanced fighter jet.	The exact timeline for the divestiture of A-10s at Davis-Monthan AFB is still subject to change. As A-10s are retired, they would likely be replaced by other fighter aircraft that would use the airspace addressed in this EIS. The analysis in this EIS includes a modest increase in operations to account for year-to-year fluctuations and variations of use throughout the MOAs. It is expected that replacement aircraft use of the airspace would be similar to A-10s and not present a cumulative effect.	None

Table 1 Past, Present, and Reasonably Foreseeable Actions within the ROI for Proposed Airspace Optimization			
Action	**Description**	**Contribution to Cumulative Effects**	**Resources Affected**
Off-Installation Transit and Training for Marine Corps Installations West (under development)	The proposed action would involve the establishment of an off-installation training program and include land-use agreements with regional landowners or land managers to facilitate that training in the Marine Corps Installations West Area of Operations. These agreements would allow the Marine Corps to utilize off-installation land in the southwestern U.S. for training purposes consistent with the rights and interests of the landowners and land managers. The purpose of the proposed action is to provide Marines with reliable and consistent access to off-installation air traffic transit routes and training sites within the region. One of the proposed training sites is located at Playas, NM and associated with the Playas MOA.	This project is reasonably foreseeable and if implemented could include a training site beneath Tombstone MOA. It is unknown how often this training site would be used, but it is anticipated that any aircraft operations associated with the training would fall within the transient aircraft operations addressed in all of the alternatives for this EIS. The DAF and USMC would be responsible for deconflicting use of the Tombstone MOA or the Playas MOA.	Noise Air Quality
Other Agency or Private Actions			
U.S. Customs and Border Protection, Construction of Barrier Wall (no NEPA document; 2001 to ongoing)	Illegal immigrant and smuggler traffic and the border protection and law enforcement responses that have ensued have resulted in widespread adverse environmental impacts. Damage has been as a result of cross-country driving by smugglers and Customs and Border Protection off road driving interdictions or search and rescues. In addition to vehicular damage, extensive foot traffic has impacted soils and vegetation and some areas have experienced substantial quantities of trash left behind. Construction of barrier walls, fences, and video surveillance systems has reduced the vehicular damage in some areas.	The lands along the border beneath Sells, Fuzzy, and Tombstone have likely experienced some of the vehicular damage and impacts from pedestrian traffic. These impacts can result in soil compaction, soil erosion, damage to soil crusts, altered surface and soil hydrology, disruption of wildlife migrations/movements, wildlife mortality, damage to vegetation, spread of invasive plants species, and damage to cultural resources.	Natural Resources Cultural Resources

Table 1 Past, Present, and Reasonably Foreseeable Actions within the ROI for Proposed Airspace Optimization

Action	Description	Contribution to Cumulative Effects	Resources Affected
SunZia Southwest Transmission Project Right of Way (BLM 2023)	Record of Decision signed May 2023 for transmission right of way located across 520 miles of Federal, state, and private lands between central New Mexico and central Arizona. The project would transport up to 4,500 megawatts of primarily renewable energy from New Mexico to markets in Arizona and California. New Mexico has some of the most abundant, constant wind energy resources in the United States and this resource is currently trapped due to lack of transmission infrastructure. The proposed route would originate at a planned substation in Torrance County, NM and terminate at the existing Pinal Central Substation in Pinal County, AZ. The transmission line would traverse Lincoln, Socorro, Sierra, Luna, Grant, Hidalgo, Valencia, and Torrance counties in NM and Graham, Greenlee, Cochise, Pinal, and Pima counties in AZ. In November 2023, the BLM ordered an "immediate temporary suspension" of the project affecting an approximately 50-mile segment in Arizona.	The proposed transmission line runs generally in the space between the northern boundary of the proposed expanded Tombstone and the southern boundary of Jackal and Morenci MOAs. The potential impacts associated with the construction of the transmission line would not cumulatively contribute to the potential impacts associated with the airspace optimization proposal. The purpose of the line is to transfer wind energy from existing wind farms in New Mexico to Arizona; thus this project is not expected to increase or promote wind farm development in Arizona.	Safety
Summa Silver Mining Operations, Mogollon Project (ongoing)	The Mogollon Project is located 75 miles from Silver City, New Mexico and covers an extensive silver-gold bearing epithermal vein field. This area was historically the largest silver producer in New Mexico but production stopped in 1942 due to wartime cessation of all gold and silver mining in the U.S. The size of the project was expanded to 7,730 acres of mineral rights in private and federally administered lands in the Gila National Forest in June of 2023 (Summa Silver Mining 2023).	The Mogollon Project is located below the Reserve MOA in Catron County. Silver exploratory efforts (drilling) would be another noise source in the area.	Noise

Table 1 Past, Present, and Reasonably Foreseeable Actions within the ROI for Proposed Airspace Optimization			
Action	**Description**	**Contribution to Cumulative Effects**	**Resources Affected**
Asarco Mining Operations (ongoing)	Asarco operates three copper mining sites in Arizona: Mission, Silver Bell, and Ray. The Mission mine is located beneath the Ruby/Fuzzy MOAs. Since there is no change the airspace structure of these MOAs, there is no overlap or cumulative impacts. Silver Bell Mine is not located beneath any MOAs; thus there is no overlap or cumulative impacts. The Hayden and Ray operations are located beneath the Outlaw MOA and would have a geographic overlap with MOA operations with a potential cumulative impact.	The mining operations, use Unmanned Aerial Systems (UAS) to monitor mining operations under an existing Certificate of Waiver from the FAA under 14 CFR 107. UAS operations at the mine are authorized above 400 feet AGL, not to exceed 1,200 feet AGL. Special provisions in the waiver include: operations may not be conducted at night; the UAS must be equipped with high visibility markings and/or lights visible during the daytime from a distance of no less than 3 statute mile; and operators must file NOTAM 24-hours in advance of UAS operations to include location, altitude, and/or operating area, time and nature of the activity, and number of UAS flying. There is an existing visual flight rules military training route (VR-263) with a 300-foot floor over the mine and deconfliction methods are currently prescribed in Asarco's approved Part 107 waiver (January 2023). These existing deconfliction measures would continue with implementation of the Proposed Action or any alternative.	Airspace
Continental Divide Trail Comprehensive Plan (2009)	The Continental Divide Trail crosses Federal lands administered by USDA, USFS, BLM, and NPS. The comprehensive plan is intended to set forth direction and guide the development and management of the Continental Divide Trail. The purpose of the plan is to provide a uniform trail program that reflects the purposes of the National Scenic Trail system, and allow for the use and protection of the natural and cultural resources found along the rights-of-way.	A portion of the Trail occurs on lands beneath the existing Playas MOA, Tombstone B MOA, and a very small portion on the northern edge of Reserve MOA. The proposed action would not impede or interact with any existing or planned management activities along the trail. There would be no cumulative effect.	None

Table 1 Past, Present, and Reasonably Foreseeable Actions within the ROI for Proposed Airspace Optimization			
Action	**Description**	**Contribution to Cumulative Effects**	**Resources Affected**
U.S. Forest National Forest Plans, Resource Management Plans of the BLM, Cochise County Comprehensive Plan and the Fort Huachuca Sentinel Landscape Strategic Plan (2022)	The USFS develops Forest Management Plans to guide land management activities to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. The BLM develops Resource Management Plans guide appropriate multiple uses of land and provide for management and protection of protected resources. Comprehensive Plans provide descriptions of the physical and economic features of counties and set forth long-term goals and plans to guide future development and activities.	Jackal, Outlaw, Morenci, Reserve and Tombstone MOAs lie above parts of the Gila, Coronado, Tonto and Apache-Sitgreaves National Forests. Extensive areas of BLM-managed land underly the airspace as well. The Proposed Action would not impede or interact with any existing or planned management activities and there would be no cumulative effect.	Land Use

Legend: AFB = Air Force Base; ADAIR = Adversary Air; AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; BLM = Bureau of Land Management; CATEX = Categorical Exclusion; DAF = Department of the Air Force; DoD = Department of Defense; EA = Environmental Assessment; EIS = Environmental Impact Statement; FL = Flight Level; FONSI = Finding of No Significant Impact; MOA = Military Operations Area; NEPA = National Environmental Policy Act; NPS = National Park Service; USDA = U.S. Department of Agriculture; USFS = U.S. Forest Service; USMC = U.S. Marine Corps.

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APPENDIX H
AIRSPACE IMPACT ANALYSIS TECHNICAL REPORT

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ACRONYMS AND ABBREVIATIONS

AAF	Army Airfield
AGL	above ground level
ARTCCs	Air Route Traffic Control Centers
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
ATS	Air Traffic Service
DAF	Department of the Air Force
DoD	Department of Defense
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FL	flight level
GA	General Aviation
GPS	Global Positioning System
IFR	Instrument Flight Rules
IR	Instrument Route
kts	knots
LOA	Letter of Agreement
MEA	Minimum Enroute Altitude
MOA	Military Operations Area
MSL	mean sea level
MTR	Military Training Route
NAS	National Airspace System
NAVAID	navigational aid
NM	nautical mile
NOTAMs	Notice to Air Missions
PDARS	Performance Data Analysis and Reporting System
RNAV	Area Navigation
ROI	Region of Influence
SUA	Special Use Airspace
U.S.	United States
USC	United States Code
VFR	Visual Flight Rules
VORTAC	Very High Frequency Omni-directional Range/Tactical Air Navigation
VR	Visual Route

1.0 INTRODUCTION

1.1 NATIONAL AIRSPACE SYSTEM

The National Airspace System (NAS) is a network of both controlled and uncontrolled airspace, both domestic and oceanic. It includes air navigation facilities, equipment and services, airports and landing areas, aeronautical charts, information and services, rules and regulations, procedures and technical information, and manpower and material (Federal Aviation Administration [FAA] 2023a). Airspace management and use considers how airspace is designated, used, and administered in a manner that best accommodates the individual and common needs of military, commercial, general aviation, and other users of the airspace.

In the United States (U.S.), airspace is managed and controlled by the FAA. The FAA is solely responsible for developing plans and policy for the use of airspace and for managing airspace in such a manner that it ensures the safety of flight and that all users of the NAS can operate in a safe, secure, and efficient manner (49 U.S. Code [USC] 40103[b]). The FAA considers multiple and sometimes competing demands for airspace in relation to airport operations, Air Traffic Service (ATS) Routes, military training airspace, and other special needs to determine how the NAS can best be structured to address all user requirements.

The Department of Defense (DoD) requests airspace from the FAA and schedules and uses airspace in accordance with the processes and procedures detailed in DoD Directive 5030.19, *DoD Responsibilities on Federal Aviation*, and FAA regulations. Special Use Airspace (SUA) identified for military and other governmental activities is charted and published by the National Aeronautical Charting Office in accordance with FAA Order JO 7400.2P, *Procedures for Handling Airspace Matters* (FAA 2023b). Descriptions of approved SUA, except temporary areas and controlled firing areas, are compiled and published once a year in FAA JO 7400.10E, SUA (FAA 2023c). For MOAs which overlay public use airports, there is an airspace exclusion of 1,500 feet above ground level (AGL) and below within a 3 nautical mile (NM) radius of public use airports. This exclusion may be extended when necessary (FAA 2023b). Airspace designated for military use is released to the FAA when the airspace is not needed for military requirements (DoD 2023).

Procedures governing the use of training areas and airspace operated and controlled by the Department of the Air Force (DAF) are included in Air Force Policy Directive 13-2 *Air Traffic, Airfield, Airspace and Range Management* and its implementing regulations. The DAF manages airspace in accordance with processes and procedures detailed in Air Force Manual 13-201, *Airspace Management.* Air Force Manual 13-201 also provides the guidance and procedures used to develop and process SUA actions. It governs airspace management instructions on creating and maintaining airspace that allows the DAF to meet operational needs for readiness and this includes the airspace required to support the flight training necessary to ensure pilot proficiency (DAF 2020). DAF bases supplement regulatory guidance in local flying instructions in conjunction with letters of agreement with the FAA, which expand guidance for operations within this airspace.

1.2 AIRSPACE CLASSIFICATION

Airspace is a three-dimensional resource defined by latitude, longitude, and altitude. There are six classes of airspace, A, B, C, D, E (controlled), and G (uncontrolled) that are available to all users (civilian and military) (**Figure 1.2-1**). The airspace classes dictate pilot qualification requirements, rules of flight that must be followed, and the type of equipment necessary to operate within that airspace (**Table 1.2-1**).

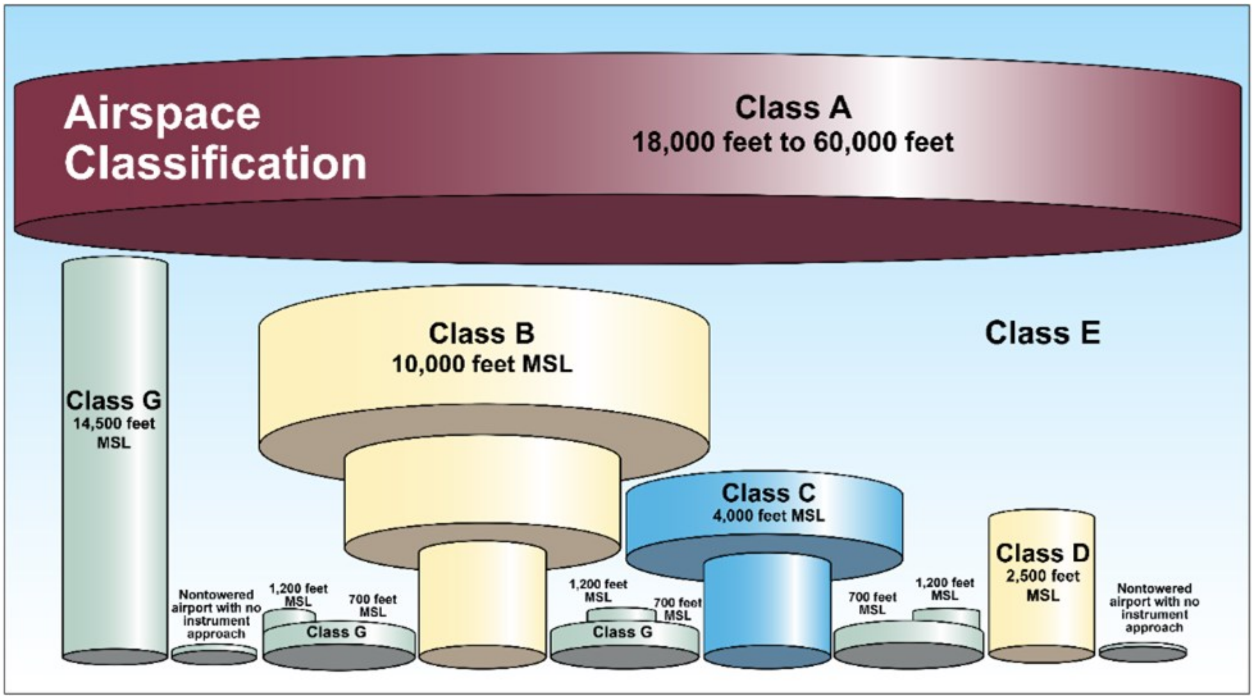


Figure 1.2-1 Airspace Classification

Controlled airspace is airspace of defined dimensions within which air traffic control service is provided (FAA 2023d). Controlled airspace is categorized into five separate classes, Classes A through E. Controlled airspace is airspace that supports airport operations and includes airways supporting en-route transit from place-to-place.

Uncontrolled airspace is designated as Class G airspace. Within the Continental U.S. and out to 12 NM off shore, Class G airspace includes all airspace up to 14,500 feet mean sea level (MSL) that has not been designated as Class A, B, C, D, or E. Class G airspace has no specific prohibitions associated with its use. Class G airspace is described as uncontrolled because there are no entry requirements and air traffic control service is not guaranteed.

Table 1.2-1 Airspace Classification Requirements

Airspace	Class A	Class B	Class C	Class D	Class E	Class G
General Definition	Controlled airspace from 18,000 feet MSL up to and including FL600	Controlled airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports	Controlled airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower and are serviced by radar approach control	Controlled airspace that extends upward from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower	Controlled airspace designated to serve a variety of terminal or en-route purposes. Class E airspace is often designated for an airport where instrument procedures exist without the presence of a control tower and as extensions to Class B, C, D, and E surface areas.	Uncontrolled airspace that has not been designated as Class A, B, C, D, or E.
Entry Requirements	Air Traffic Control Clearance	Air Traffic Control Clearance	Air Traffic Control Clearance for IFR. Two-way radio communication with Air Traffic Control required	Air Traffic Control Clearance for IFR. All require radio contact	None for VFR. Air Traffic Control Clearance and two-way radio for IFR.	None
Two-Way Radio Communication	Required	Required	Required	Required	Required only under IFR flight plan[1]	Not required[1]

Airspace	Class A	Class B	Class C	Class D	Class E	Class G
VFR Visibility Minimum[2]	NA	3 SM	3 SM	3 SM	Below 10,000 feet MSL 3 SM At or above 10,000 feet MSL: 5 SM	Below 1,200 feet AGL (regardless of MSL): Day: 1 SM; Night: 3 SM; Above 1,200 feet AGL and less than 10,000 feet MSL: Day: 1 SM; Night: 3 SM At or Above 10,000 MSL:5 SM.
Traffic Advisories	Yes	Yes	Yes	Workload Permitting	Workload Permitting	Workload Permitting

Notes: [1]Unless a temporary tower is present. [2]Minimum distance from clouds vary by airspace class and altitude.
Legend: AGL = above ground level, FL = Flight Level, IFR = Instrument Flight Rules; VFR = Visual Flight Rules; NA = Not Applicable; SM = Statute Mile; MSL = mean sea level.
Source: FAA 2023d.

Airspace in the NAS is divided into two categories, regulatory and non-regulatory. The airspace described above, and in **Figure 1.2-1** (except Class G airspace) is regulatory. Non-regulatory airspace includes military operations areas (MOAs), warning areas, alert areas, controlled firing areas and national security areas. Within these two categories of airspace, there are four subcategories, controlled, uncontrolled, SUA and other airspace (FAA 2023d).

1.3 General Flight Rules and Resources

There are specific operational requirements for each class of airspace. Some airspace, such as Class A, requires users to operate under instrument flight rules (IFR), while other airspace allows for visual flight rules (VFR), and in many cases IFR/VFR operate within the same space. The FAA produces charts and publications to guide civil and military flights within the NAS. Aviators can find specific information on airspace and regulatory requirements in VFR/IFR Navigation Charts, Planning Charts and a variety of supplementary charts and publications (FAA 2023d). These aeronautical charts depict information necessary for flight operations such as, ATS routes (victor airways and jet routes), military training routes, aerial refueling tracks, public and private airports and available aids to navigation.

FAA JO 7110.65A *Air Traffic Control*, establishes procedures for personnel who provide air traffic control (ATC) services within the NAS (FAA 2023e). The primary purpose of the ATC system is to prevent a collision involving aircraft operating in the system. The ATC system is designed to give first priority (duty priority) to separating aircraft and issuing safety alerts, provide support to national security and homeland defense activities. Behind duty priority, is the ATC system's operational priority, which provides service to aircraft on a "first come, first served" basis with the following exceptions (list is not all inclusive); air ambulance flights, presidential aircraft and support elements, active air defense scrambles, and aircraft engaged in navigation aid checks (FAA 2023e).

1.4 Special Use Airspace

SUA is airspace of defined dimensions identified by an area where activities must be confined due to their nature, and where limitations are imposed on aircraft operations that are not a part of those activities (non-participating aircraft). This airspace is defined by designated altitude ceilings and floors and horizontal boundaries described in geographic coordinates. Information on SUA is contained in aeronautical charts and in FAA JO 7400.10E (FAA 2023c).

1.5 Military Training Routes and Aerial Refueling Tracks

The Military Training Routes (MTRs) in the vicinity of Tombstone, Bagdad, and Gladden MOAs are provided in **Table 1.5-1**. Training along Visual Routes (VRs) is conducted under VFR and training along Instrument Routes (IRs) is conducted under IFR.

The MTRs located in the Tombstone MOA are managed and scheduled by the 355th Wing's Scheduling Office. The proposed modifications to the Tombstone MOA would not affect MTR operations. Scheduling procedures and existing rules of operation would ensure deconfliction of aircraft.

The MTRs located in the Bagdad and Gladden MOAs are managed and scheduled by the 56th Range Management Office, Training Air Wing Two, Naval Air Station Kingsville, and the 3d Marine Aircraft Wing at Marine Corps Air Station Miramar. The proposed modifications to the floors of Bagdad and Gladden would require coordination between various DoD entities during the scheduling process to ensure continuity of MTR operations. Scheduling procedures and existing rules of operation would ensure deconfliction of aircraft.

There is one aerial refueling track within the Tombstone MOA and Air Traffic Control Assigned Airspace (ATCAA), AR-639. Refueling operations in AR-639 are conducted between 16,000 feet MSL and Flight Level (FL) 280. There is one aerial refueling track within the Bagdad/Gladden ATCAA, AR-603. Refueling operations in AR-603 are conducted between FL240–FL280.

DoD would internally handle scheduling and use of MTRs and aerial refueling tracks. The Proposed Action would not have an impact to MTRs or refueling tracks and do not require further analysis.

Table 1.5-1 MTRs in the Vicinity of MOAs/ATCAAs

IR-112	VR-239	VR-260
IR-213	VR-241	VR-263
IR-214	VR-242	VR-268
IR-250	VR-243	VR-269
IR-254	VR-244	VR-299
VR-176	VR-245	VR-1267
VR-223	VR-259	VR-1268
VR-231		

Legend: MOA = Military Operations Area; MTR = Military Training Route;.

1.6 SUA Scheduling and Activation

Several different terms are used to describe the use of the SUA at various times during the day. The definitions are below and reference **Figure 1.5-1**, which shows a notional depiction for part of a fictional day regarding use of a particular SUA. In this example, SUA refers to MOAs. The FAA annually publishes a listing of regulatory and non-regulatory airspace, to include the times of use, and the using and scheduling agency in this case the DAF.

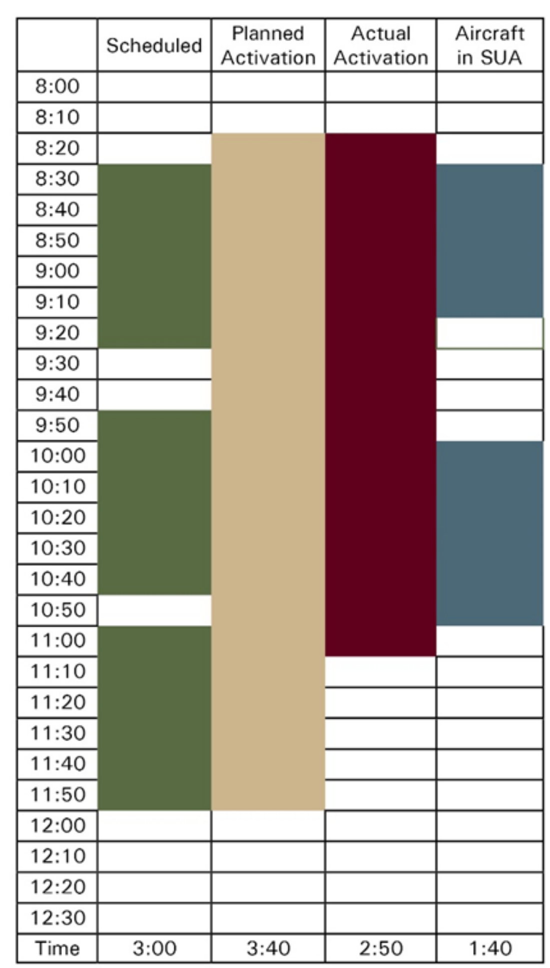


Figure 1.5-1 Notional Partial-Day Schedule for SUA

Scheduled. When a military flying unit wants to use a particular SUA, it will be scheduled ahead of time with central scheduling for discreet time blocks. For instance, in order to accomplish a particular training event, a squadron may schedule a restricted area for one hour, with the intent to have multiple aircraft use it for that hour. In Figure 1.5-1, the green bars show three separate 1-hour periods.

Planned Activation. When military users schedule a particular SUA for discreet blocks of time, with only short times in between, the airspace will generally be considered “active” during this down period. The process of returning airspace for a short period of time would generate more work for controllers while not providing appreciable benefit to potential airspace users. In the example shown in Figure 1.5-1, there are two short “gap” times between military scheduled use, one of 20 minutes, and one of 30 minutes. In cases like these, the planned activation time (shown as tan in color) will include those small gaps. It is generally more efficient for all users of the airspace to plan for airspace activation times that cover these small discreet gaps. Also note that the activation typically begins slightly before the arrival of the first military user, so essentially there should be no delay for entering into the SUA. In the example shown in Figure 1.5-1, the planned activation would begin 10 minutes prior to the first user, and last until the last user leaves the airspace, per the schedule. SUA activation times can be retrieved from the FAA's SUA website, https:/sua.faa.gov.

Actual Activation. This is the amount of time that the SUA is activated in real time, and accounts for any changes from the plan. In the example shown in Figure 1.5-1, the actual activation time is shown in maroon. The airspace is activated as planned at 8:20, 10 minutes prior to the first scheduled user's arrival in the airspace. It is kept activated (per the plan) until it is apparent that the third user, scheduled to begin at 11:00, will not be using the airspace, at which time the SUA is deactivated, and is therefore available for other uses. A cancellation of scheduled SUA time can happen for a multitude of reasons, including maintenance problems with the aircraft or weather conditions that preclude the aircraft from either flying or completing the training as planned. Actual activation of a SUA is what would restrict VFR/IFR aircraft from flying through that section of airspace.

Aircraft in SUA. This is simply the time that military aircraft are present in the activated SUA. In the example shown in Figure 1.5-1, aircraft presence in the SUA is shown with the blue bars. The first scheduled user arrives on time at 8:30 and departs about 10 minutes early at 9:20 (perhaps from training being complete, being low on fuel, or some other reason). The second event shown is scheduled from 9:50 until 10:50, but the aircraft arrives to the airspace late (at 10:00), and leaves per their schedule. The third event is cancelled and will not use the airspace as scheduled. When the ATC learns that the SUA will not be used as scheduled, the FAA is informed through internal coordination procedures, and the SUA deactivated. Once deactivated, ATC will allow aircraft to travel through the confines of the SUA. Non-participating aircraft will be rerouted or vectored by ATC to ensure approved separation exits. Aircraft using a MEDEVAC callsign are afforded priority handling where the MOA would be required to go "cold" to allow a transition through. Emergency aircraft have the right-of-way over all other air traffic and would also have the MOA go "cold" to allow a transition. The pilot of civil aircraft should always plan for deviations around active MOAs.

In summary, Figure 1.5-1 shows four different schedule terms commonly used when discussing the use of SUA. In this example, the hypothetical SUA was "Scheduled" for 3 hours. It was planned to be activated for a single long block of 3 hours, 40 minutes. Its actual activation time (in real time) was just 2 hours and 50 minutes. During actual activation, there were military aircraft actively present in the MOA for an hour and 40 minutes. This section and Figure 1.5-1 is to highlight that aircraft are not present for the full published times of use. Aircraft presence will vary on any given day depending on the training event.

1.7 General Operating Procedures

Operations within SUA are generally conducted under VFR and with some exceptions IFR. MOAs are established to separate certain military activities from IFR traffic, non-participating IFR traffic may be cleared through the airspace if ATC can provide IFR separation. Pilots operating under VFR are not prohibited from transiting an active MOA but should exercise extreme caution when military activity is being conducted. Pilots can request the status of a MOA by contacting the flight service stations within 100 miles of the area or by contacting the using or controlling agency (FAA 2023d). Additionally, the FAA maintains an informational SUA website to assist pilots and aircrews with flight planning and familiarization (FAA 2023f).

2.0 METHODOLOGY FOR ANALYSIS

2.1 IMPACTS TO CIVIL AIR TRAFFIC

2.1.1 Data Source

FAA's Performance Data Analysis and Reporting System (PDARS) data was used to analyze the existing civil traffic in the project's area of influence. The PDARS continuously collects flight plan and radar track data from systems located at Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control Facilities, and ATC towers. The dataset in this study is based on recorded flight data from calendar year 2022 (January 1 through December 31, 2022). A full year was analyzed to adequately cover any seasonal fluctuations.

2.1.2 Filtering of Flight Tracks

For each MOA/ATCAA, all historical flight tracks from the radar data that passed through the proposed lateral boundaries and within the proposed altitudes and proposed times of operation were identified. The intent of this was to determine the number of aircraft that would potentially be impacted by activation of the proposed airspace. The magnitude of the impact will be determined based on the changes required to avoid the proposed airspace during times of activation.

One characteristic of the PDARS dataset is that there are many aircraft for which the category is listed as "Unknown," indicating there are one or more data fields missing to properly identify them. In this analysis, the unknowns were further filtered to determine if some were identifiable based on other data fields. The following filters were used to categorize as many unknown flight tracks as possible:

1. Aircraft with 1202 or 1255 beacon codes were classified as general aviation (GA). These codes are available in lieu of 1200 for VFR gliders and firefighting aircraft not in contact with ATC.

2. Unknown aircraft that both originated and terminated at a military airfield were considered military and removed from the dataset.

3. Unidentified aircraft flying 'low and fast,' defined as below 10,000 feet MSL and greater than 300 knots (kts), were classified as military and removed from the dataset.

2.1.3 Impacts to Flight and Rerouting Methodology

For each of the civil flight tracks that crossed the proposed MOA/ATCAA, the origin and destination airport were identified and counted – providing a list of the number of flights per year traveling to and from each airport. The number of unique combinations of origin and destination airports was in the thousands, with many combinations occurring only once or very infrequently. The list was reduced to focus on the most frequently occurring airport origin-destination pairings, to represent the majority of traffic potentially affected by the proposed airspace and produce a manageable and meaningful analysis. Impacts to military aircraft are not considered – the assumption is that DoD activation of the proposed SUA indicates acceptance of the impacts to other DoD aircraft for the duration of the airspace activation. Impacts are counted for non-military aircraft only.

The distance between each of the most common origin-destination pairings was calculated point to point in a straight line. Though this is not likely the actual routing used, it represents a best-case straight line distance directly from the origin airport to the destination airport. In certain cases, when straight-line routing would result in a flight going through areas with other active SUA, the baseline distance was calculated using a common routing typically used to avoid that SUA. These cases are discussed in the individual sections.

To determine the potential impact to these common flights which cross the proposed MOAs, an alternative routing was calculated using a navigational aid (NAVAID) or intermediate "fix" which would route these flights outside the proposed MOA/ATCAAs. Routes were identified from origin to the intermediate fix, and from the intermediate fix to the destination, and added together to produce the total distance that would result from rerouting flights around the proposed MOA/ATCAAs. The change in distance was calculated by comparing the baseline straight line routing to the alternative routing using NAVAIDs. The change in flight time (i.e., "extra minutes" needed to navigate around proposed MOA/ATCAAs) was determined using a speed estimate. For aircraft crossing the MOA/ATCAA, the assumed true airspeed was 170 kts for aircraft below 10,000 feet, and 330 kts for those between 10,000 and 18,000 feet MSL. These airspeed numbers are based on the average types of aircraft in the dataset for the particular altitude bands. All calculations assume no wind. While pilots operating under VFR are permitted to transit through a MOA, this analysis assumes VFR aircraft will not enter the MOA when it is active and would require alternative routings to avoid the MOA.

2.2 AIRPORTS IN THE REGION OF INFLUENCE

FAA air traffic controllers are responsible for ensuring the safe flight of aircraft through the NAS. Requirements for reporting airport aircraft operations are detailed in FAA Joint Order 7210.55G, Operational Data Reporting Requirements (FAA 2017). This analysis uses airport data operations reported to the FAA as the basis for analyzing the potential effects on aircraft operations at airports located beneath, or in close proximity to the existing and proposed MOAs/ATCAAs.

There are two types of airports, towered and non-towered, which are further subdivided into Civil Airports that are open to the public; Military/Federal Government Airports that are operated by the military or other agencies of the Federal Government; and Private Airports that are designated for private or restricted use and not open to the public. Towered airports have an operating control tower in which ATC is responsible for providing the safe, orderly and expeditious flow of air traffic and all pilots are required to maintain two-way radio communication with ATC. Non-towered airports do not have operating control towers and, although advisable, two-way radio communications are not required. Airports within the region of influence (ROI) for the Tombstone, Outlaw, Jackal, Bagdad, and Gladden MOAs (those with proposed horizontal and/or vertical changes) are discussed in detail in Section 3.2 below. The proposed changes to published times of use for the Sells, Ruby, Fuzzy, Morenci, and Reserve MOAs are administrative and do not change the dimensions of the airspace, thus there would be no impact to airports beneath or in the vicinity of these MOAs.

3.0 ANALYSIS

3.1 INTRODUCTION

This analysis evaluates the three action alternatives addressed in the Environmental Impact Statement (EIS): Alternative 2 – Proposed Action, Alternative 3, and Alternative 4. Alternative 1 is the No Action Alternative and would not modify any of the existing airspace; thus a detailed analysis on the impacts to civil users is not necessary.

3.2 ALTERNATIVE 2 – PROPOSED ACTION

The proposed dimensional changes to Tombstone, Outlaw, Jackal, Bagdad, and Gladden MOAs/ATCAAs have the potential to impact the instrument approach procedures at some airports and result in rerouting civil aircraft around the MOAs/ATCAAs. These impacts would only occur during times when the airspace is active. The potential impacts for each MOA/ATCAA are described in detail in **Section 3.2.1 through 3.2.3**.

The Proposed Action does not include changes to the horizontal or vertical dimensions of the Sells, Ruby, Fuzzy, Morenci, or Reserve MOAs or their associated ATCAAs; therefore, airspace management would be unchanged within this airspace and there is no discussion about airports or civil aviation. The proposed change to published times of use would be an administrative change to improve scheduling and is discussed briefly in **Section 3.2.4.**

3.2.1 Tombstone MOA/ATCAA

The proposed Tombstone MOA/ATCAA under Alternative 2 – Proposed Action is illustrated in **Figure 3.2-1**.

3.2.1.1 Airports

Table 3.2-1 provides information for each of the public and private airports located beneath or in close proximity to the existing and proposed Tombstone MOA/ATCAA. **Figure 3.2-2** provides the location of these airports. There is one military airport in the ROI for Tombstone, Sierra Vista Municipal – Libby Army Airfield (AAF). There is one U.S. Forest Service emergency use only heliport in the ROI and one unverified landing area that is not discussed in the table below. Detailed discussions of each publicly owned airport follow the table. The airport operations data provided in **Table 3.2-1** was obtained from data reported to the FAA. Sixteen private airports are within the ROI for the Tombstone MOA/ATCAA. Aircraft operating from private airports typically fly using VFR and at lower altitudes where radar coverage is limited or non-existent. As can be seen in Table 3.2-1, operational statistics are not available or not reported to the FAA for any of the private airports within the ROI.

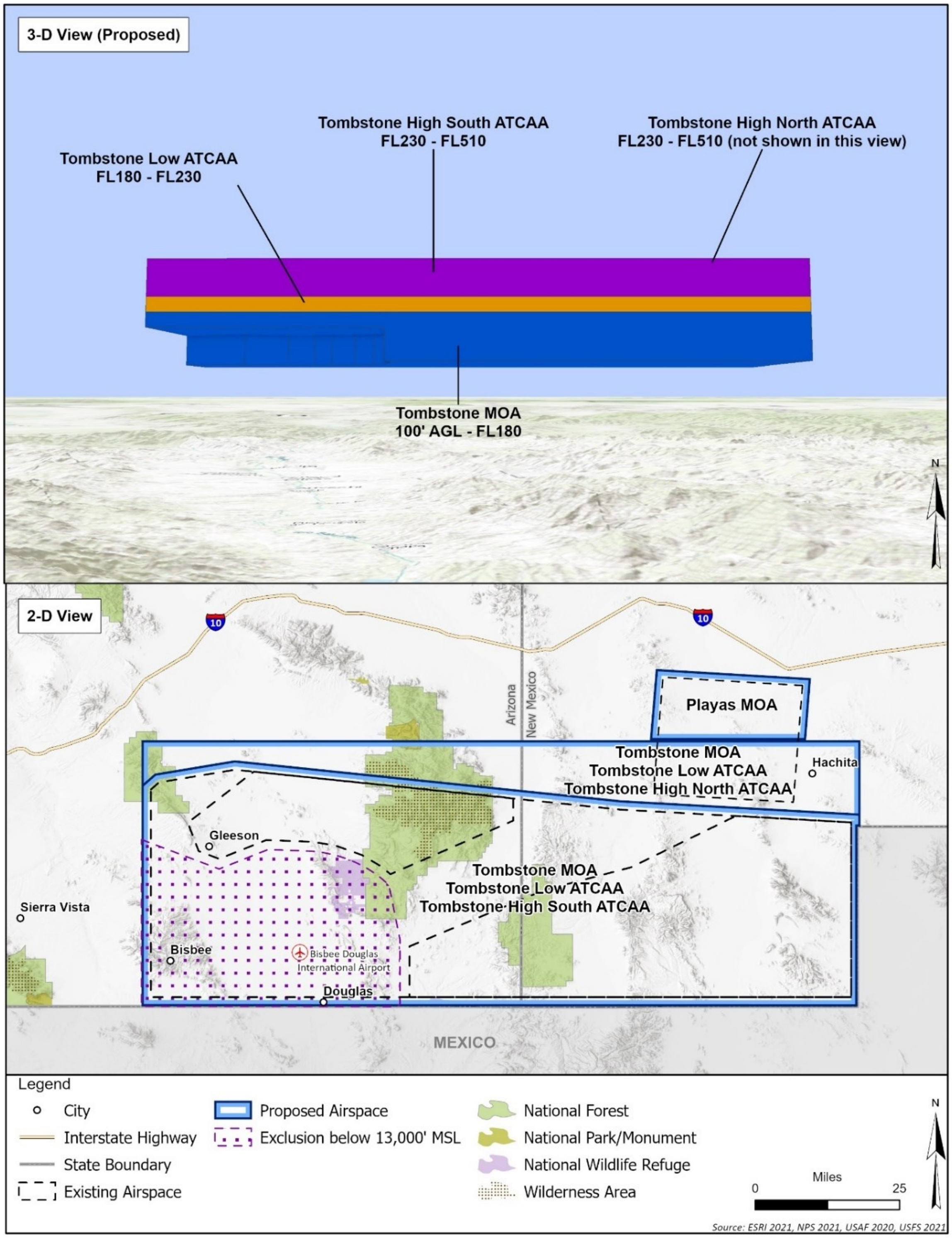


Figure 3.2-1 Proposed Tombstone MOA/ATCAA

Table 3.2-1 Airports in the Tombstone MOA/ATCAA ROI

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations
Bisbee Douglas International Airport (DUG), Douglas Bisbee, Arizona	Public	Tombstone C	Exclusion Area	2 Single Engine	Air Taxi = 500 GA Local = 4,000 GA Itinerant = 15,000 Military = 10,000
Bisbee Municipal Airport (P04), Bisbee, Arizona	Public	Tombstone C	Exclusion Area	16 Single Engine 1 Multi-Engine 2 Helicopters	GA Local = 1,100 GA Itinerant = 1,800
Cochise College Municipal Airport (P03), Douglas, Arizona	Public	Tombstone C	Exclusion Area	Single Engine = 8 Multi-engine = 1	GA Local 45,000 GA Itinerant = 200 Military = 25
Douglas Municipal Airport (DGL), Douglas, Arizona	Public	Tombstone C	Exclusion Area	Single Engine = 20 Multi-Engine = 1 Helicopters = 1	GA Local = 3,500 GA Itinerant = 7,500 Military = 500
Ethnos Air Airport (2AZ9), McNeal, Arizona	Private	Tombstone C	Exclusion Area	None Reported	None Reported
Circle H Ranch Airport (AZ17), Douglas, Arizona	Private	Tombstone C	Exclusion Area	None Reported	None Reported
Ash Creek Airport (6AZ5), Pearce, Arizona	Private	Tombstone A/C	Tombstone MOA	None Reported	None Reported
Rancho Relaxo Airport (7AZ4), Pearce, Arizona	Private	Tombstone A/C	Tombstone Proposed Expansion	None Reported	None Reported
Mystery Well Ranch Airport (25AZ), Portal, Arizona	Private	Tombstone A/C	Tombstone MOA	None Reported	None Reported
Diamond Ranch Airport (NM64), Animas, New Mexico	Private	Tombstone B/C	Tombstone MOA	None Reported	None Reported
Tombstone Municipal Airport (P29)[1], Tombstone, Arizona	Public	Tombstone C	Exclusion Area	Single-Engine = 2 Ultralight = 2	GA Local = 40 GA Itinerant = 300
Sierra Vista Municipal-Libby AAF (FHU)[1], Fort Huachuca, Arizona	Army/ Public Use	Tombstone C	Exclusion Area	Single-Engine = 35 Multi-engine = 3 Helicopters = 1 Gliders = 1	Commercial = 5,013 GA Local = 6,887 GA Itinerant = 10, 905 Military = 96, 469
Playas Airstrip Airport (NM86)[1], Playas, New Mexico	Private	Playas MOA	Tombstone Proposed Expansion	None Reported	None Reported

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations
Thurmond Airport (NM12)[1], Animas, New Mexico	Private	Tombstone C	Tombstone Proposed Expansion	None Reported	None Reported
Amigos del Cielo Airport (NM90), Rodeo, New Mexico	Private	Tombstone A/C	Tombstone Proposed Expansion	None Reported	None Reported
Rodeo Airport (NM70), Rodeo, New Mexico	Private	Tombstone A/C	Tombstone Proposed Expansion	None Reported	None Reported
Ammon Airport (AZ14), Wilcox, Arizona	Private	Tombstone C	Tombstone Proposed Expansion	None Reported	None Reported
Stronghold Airport (09AZ)[1], St. David, Arizona	Private	Tombstone C	Tombstone Proposed Expansion	None Reported	None Reported
Rancho San Marcos Airport (74AZ)[1], Tombstone, Arizona	Private	Tombstone C	Exclusion Area	None Reported	None Reported
Skyline Air Ranch Airport (1AZ6)[1], Sierra Vista, Arizona	Private	Tombstone C	Exclusion Area	None Reported	None Reported
Thompson International Aviation Airport (03AZ)[1], Hereford, Arizona	Private	Tombstone C	Exclusion Area	None Reported	None Reported
Evelyn Field Airport (AZ26)[1], Palominas, Arizona	Private	Tombstone C	Exclusion Area	None Reported	None Reported

Notes: [1]indicates in the vicinity of the MOA (not beneath)
Legend: ATS = Air Traffic Service; MOA = Military Operations Area; ROI = Region of Influence; GA = General Aviation.
Source: SkyVector 2023.

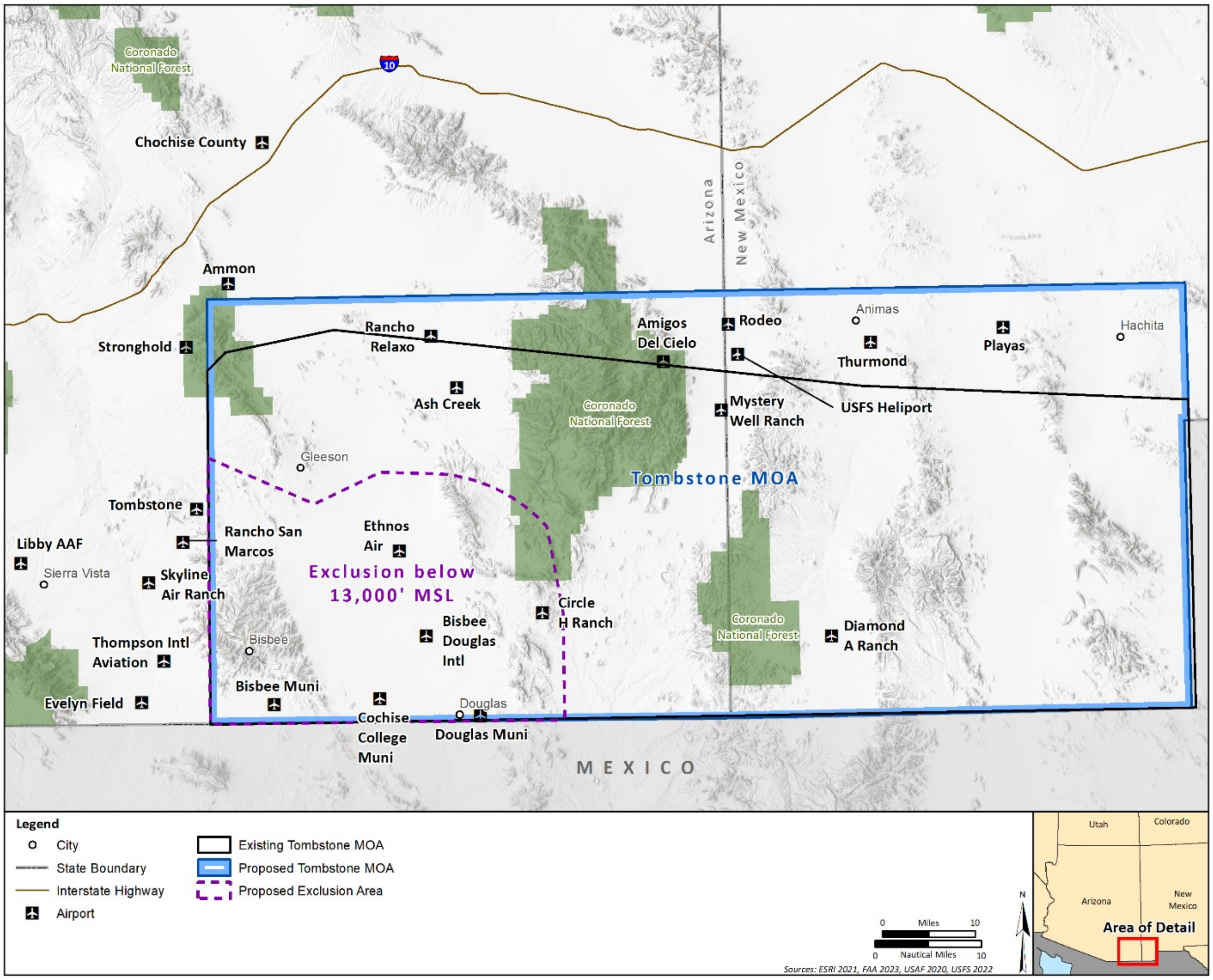


Figure 3.2-2 Airports in the Tombstone MOA/ATCAA ROI

Bisbee Douglas International Airport (DUG), Douglas Bisbee, Arizona, is located 8 miles northwest of Douglas Bisbee, Arizona and beneath the southwest quadrant of the Tombstone MOA. The airport, publicly owned by Cochise County, is a non-towered airport with approach/departure services provided by Albuquerque ARTCC. Bisbee Douglas International Airport is a general aviation airport and no commercial flight services are offered. The airport is located within Class E airspace that extends upward from 700 feet AGL within 5-mile radius of the airport with Class E extensions to the northwest of the airport. The Class E airspace surrounding Bisbee Douglas is beneath the existing Tombstone C MOA and would be under the proposed exclusion. This airport has two runways, Runway 17/35 and Runway 8/26 with published instrument approaches to Runway 17. There were 29,500 airport operations reported to the FAA for the 12-month period ending April 10, 2023 (SkyVector 2023).

Bisbee Municipal Airport (P04), Bisbee, Arizona, is located 5 miles southeast of Bisbee, Arizona and beneath the southwest quadrant of the Tombstone MOA. The airport, publicly owned by the City of Bisbee, is a non-towered airport with communications provided by Prescott Radio. Bisbee Municipal Airport is a general aviation airport and no commercial flight services are offered. The airport offers pilot instruction services. The airport is located within Class G airspace and would be located within the proposed exclusion area under the Tombstone MOA. Bisbee Municipal has two runways, Runway 2/20 and Runway 17/35, and has no published instrument procedures. There were 2,900 airport operations reported to the FAA for the 12-month period ending April 11, 2023 (SkyVector 2023).

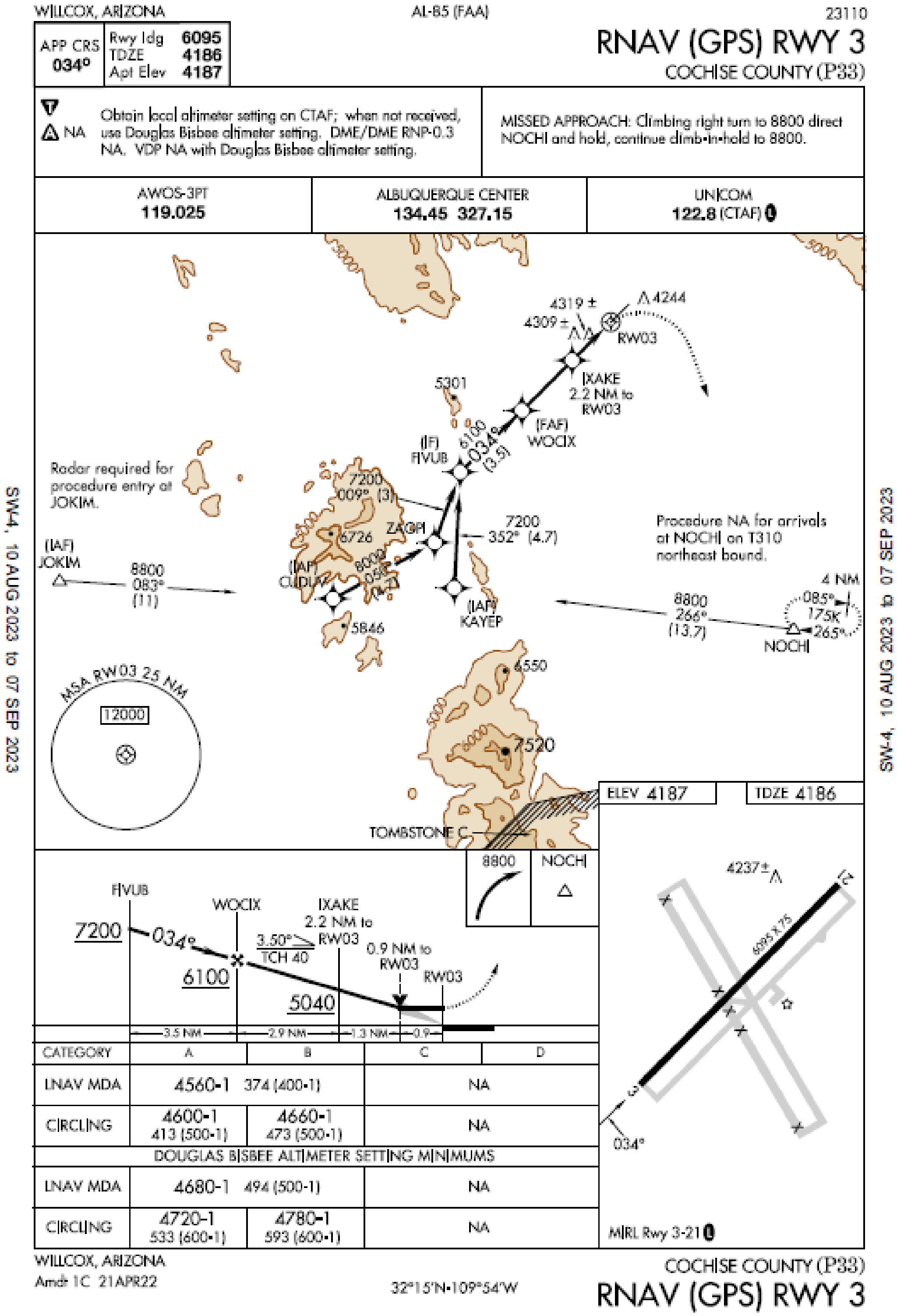
Cochise College Municipal Airport (P03), Douglas, Arizona, is located 7 miles west of Douglas, Arizona and beneath the southwest quadrant of the Tombstone MOA. The airport, publicly owned by Cochise College, is a non-towered airport with airport communication provided on an advisory frequency. Cochise College Airport is a general aviation airport and no commercial flight services are offered. The airport offers pilot instruction services. The airport is located within Class G airspace and would be located within the proposed exclusion area under the Tombstone MOA. Cochise College has one runway, Runway 5/23, and has no published instrument approaches. There were 45,225 airport operations reported to the FAA for the 12-month period ending April 11, 2023 (SkyVector 2023).

Douglas Municipal Airport (DGL), Douglas, Arizona, is located 2 miles east of Douglas, Arizona beneath the southwest quadrant of the Tombstone MOA. The airport, publicly owned by the City of Douglas, is a non-towered airport with airport communications provided by Prescott Radio. Douglas Municipal is a general aviation airport and no commercial flight services are offered. The airport offers air ambulance services. The airport is located within Class G airspace and would be located within the proposed exclusion area under the Tombstone MOA. Douglas Municipal has two runways, Runway 3/21 and Runway 18/36, and has no published instrument approaches. There were 11,500 airport operations reported to the FAA for a 12-month period ending April 11, 2023 (SkyVector 2023).

Tombstone Municipal Airport (P29), Tombstone, Arizona, is located 3 miles southeast of Tombstone, Arizona and is outside the western boundary of the Tombstone MOA. The airport, publicly owned by the City of Tombstone Department of Public Works, is a non-towered airport with communications provided on an advisory frequency. Tombstone Municipal is a general aviation airport and no commercial flight services are offered. The airport offers pilot instruction services. The airport is located within Class G airspace adjacent to the Sierra Vista Municipal Airport Class E airspace. Tombstone Municipal has one runway, Runway 6/24, and has no published instrument approaches. There were 340 airport operations reported to the FAA for a 12-month period ending April 12, 2023 (SkyVector 2023).

Sierra Vista Municipal-Libby AAF (FHU), Fort Huachuca, Arizona, is located 3 miles north of Sierra Vista Fort Huachuca, Arizona and is 18 miles outside the western boundary of the Tombstone MOA. The airport is a general aviation, military/civil joint use airport owned by the U.S. Army Intelligence Center. This is a towered airport with approach/departure service provided by Albuquerque ARTCC and by the Tucson Remote Communications Air/Ground when Libby Approach is closed. The airport is located within Class D airspace and surrounding Class E airspace. Restricted Area-2303 A and B overlay the airport. Libby AAF has three runways, Runway 8/26, Runway 12/30, Runway 3/21 and one helipad. The airport has instrument approaches published to Runway 8/26 only. There were 119,274 airport operations reported to the FAA for a 12-month period ending October 31, 2013 (SkyVector 2023).

Under Alternative 2 – Proposed Action, specifically the northern Tombstone MOA/ATCAA expansion, instrument approach procedures to Cochise County Airport (P33) would be impacted when the MOA is active. Cochise County Airport itself is not within the ROI and was not listed in **Table 3.2-1** due to its distance from MOA boundary, but it is illustrated on **Figure 3.2-2**. The missed approach procedure for the Area Navigation (RNAV) Runway 3 approach to Cochise County requires aircraft to hold at the fix NOCHI, near the northern boundary of the Tombstone expansion (**Figure 3.2-3**). During times when the MOA is active, if a missed approach occurs, ATC would have to issue alternate instructions or procedures. This impact is expected to be minimal.



Source: SkyVector 2023.

Figure 3.2-3 Cochise County RNAV (GPS) Runway 3

The RNAV Runway 17 approach to Bisbee Douglas International traverses the northern portion of the existing Tombstone MOA (**Figure 3.2-4**). Though Bisbee Douglas Airport itself is in the exclusion area (and would continue to be), the approach currently overlaps with Tombstone A. During times when Tombstone A is active, another approach is assigned. Combining Tombstone A, B, and C and lowering the floor would require that another approach fix be used when the MOA is active, similar to the current situation. This impact is expected to only occur marginally more frequently than it does currently. Instrument procedures to these airports would require ATC to issue alternate approach instructions, such as the use of a different initial approach fix during times when the SUA is active. This impact is expected to be minimal.

There are at least three standard arrival and departure procedures at Tucson International Airport which would be impacted by the proposed Tombstone MOA expansion. Tucson International Airport is not included in the ROI due to its distance from the MOA boundary. Not all of these procedures traverse the proposed airspace, but the course is close to the MOA boundary that airspace separation may be affected. These procedures would need to be redesigned or modified to remain clear of the MOA when it is active. These procedures are not detailed in this analysis and this information is included for awareness.

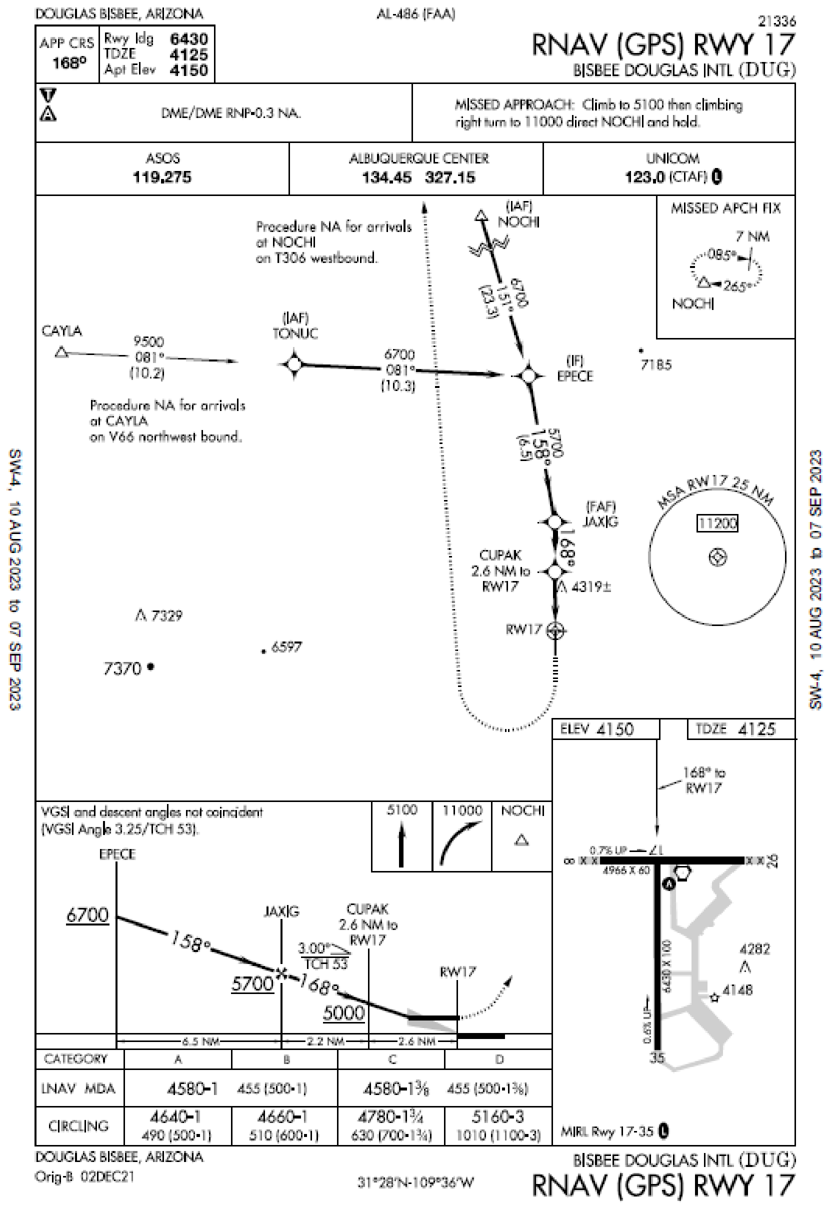
3.2.1.2 ATS Routes

There are six ATS routes which traverse or occur near the proposed Tombstone MOA/ATCAA, V-16, V-66, V-198, T-306, T-310, J-2, J-50 and Q-4 (**Figure 3.2-5**). The San Simon Very High Frequency Omni-directional Range/Tactical Air Navigation (VORTAC) (SSO) is approximately 16 NM from the northern boundary of the northern Tombstone MOA expansion and is a spoke for flights traveling east and west. V-66 runs diagonally through the corridor between the existing Tombstone A and B MOAs beneath the Tombstone C MOA. It traverses the airspace inbound to Bisbee Douglas International Airport and outbound on the western side of the MOA.

V-16 penetrates the existing Playas MOA; the Playas MOA altitudes are 300 feet AGL to (but not including) FL180 and times of use are published by Notice to Air Missions (NOTAM). Under the Proposed Action, the southern boundary of the Playas MOA would move up and be replaced by the northern expansion in Tombstone. The Proposed Action would require scheduling of the modified Playas MOA concurrently with the expanded Tombstone MOA/ATCAA. The impact to V-16 under the Proposed Action would be similar as is currently experienced when the Playas MOA is active.

V-198 penetrates a very small corner of the MOA on the northeastern boundary. Aircraft separation from the boundary of the MOA would require ATC to issue slight deviations of flight course to ensure the required separation is maintained between aircraft and the boundary of the airspace when the MOA is active. This is expected to be a minimal impact and similar to impacts when the existing Playas MOA is active.

Route T-306 (minimum enroute altitude [MEA] 10,700 feet MSL) traverses a sizable portion of the proposed northern expansion of Tombstone MOA. T-310 (MEA 10,000 feet MSL) cuts through a small portion of the northwest corner of the proposed northern expansion. These two "T Routes" intersect at the waypoint NOCHI and navigation via these routes would need to be rerouted when the MOA is active. Aircraft on T-306 and T-310 would require alternative routing on victor routes via San Simon or radar vectors to avoid the MOA when it is active.



Source: SkyVector 2023.

Figure 3.2-4 Bisbee Douglas RNAV (GPS) Runway 17

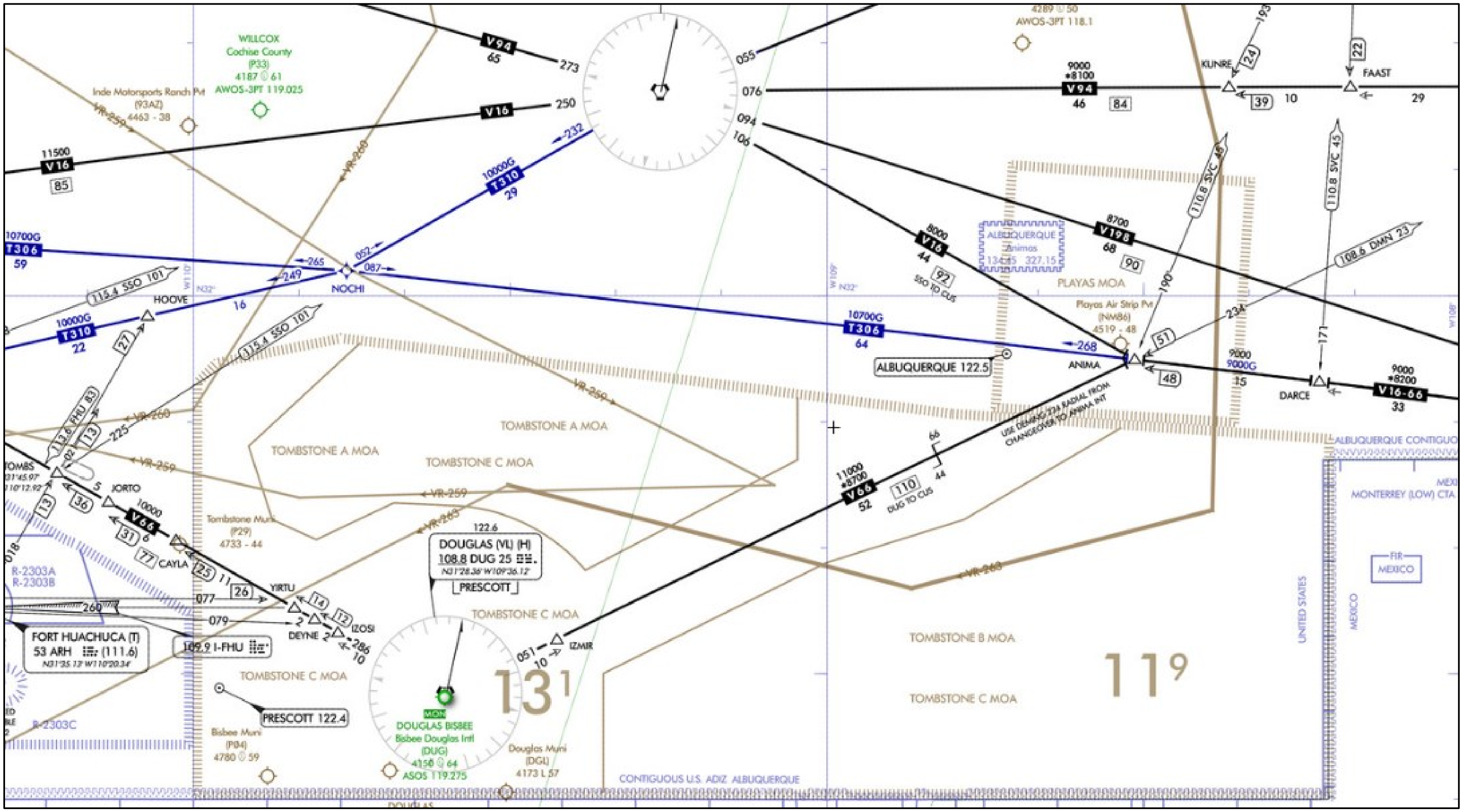


Figure 3.2-5 Tombstone MOA ATS Routes and MTRs

There are two high-altitude routes which transition through the Tombstone ATCAA, J-2 and J-50. Civil traffic on these two routes would be impacted only when the proposed Tombstone High North ATCAA is active. Area navigation route Q-4 does not penetrate the Tombstone High North ATCAA but runs near the northeast corner of the airspace and separation between aircraft and the boundary may require slight deviations in the route while the ATCAA is active. There are four waypoints inside the northern expansion that would be unusable when the ATCAA is active, GRNNT, TELKE, KA12S, and KA12Q.

V-16 (MEA 9,000 feet MSL) enters the proposed northern Tombstone expansion from the east near the Playas Airstrip at DARCE and exits northbound to the San Simon VORTAC. This airway has an MEA of 9,000 feet MSL and flights along this route would require slight deviations during times when the Tombstone MOA is active.

V-66 (MEA 11,000 feet MSL) runs diagonally through the corridor between the existing Tombstone A and B MOAs beneath the Tombstone C MOA, inbound to Bisbee Douglas International Airport and outbound on the west side of the MOA. This route would be absorbed from the proposed changes to Tombstone A, B, and C MOAs. The PDARS data show approximately 280 civil flight operations on or near the V-66 route during the days and times the SUA would be active (approximately 23 flights per month). The majority of the traffic which transited the V-66 corridor was VFR and 66 percent of the total flights did not have a known origin or destination airport.

The most common origins and destinations for the flights in the V-66 corridor were Libby Army Airfield (FHU) and El Paso (ELP). A likely routing between ELP and FHU would be along V16-V66 inbound to FHU entering the proposed Tombstone MOA expansion from the northeast at the waypoint ANIMA. The route via ANIMA is approximately 210 NM and would take about 1 hour and 15 minutes (assumes a speed of 170 knots). Alternative options to reroute traffic around the west side of the Tombstone MOA would add approximately 12 NM and 4 to 5 minutes to the route, depending on the type of aircraft. The most common types of known aircraft transiting this route are Cessna, Piper, and Beechcraft variants which have varied cruising speeds.

For IFR aircraft departing and arriving from Douglas-Bisbee (DUG), either going to the east or arriving from the east, the “go around Tombstone option” causes a larger impact. DUG to ELP via V-66 is about 171 NM. DUG to ELP by exiting the west side of Tombstone, then going around is about 241 NM, which for GA aircraft would add an additional 25 minutes to the overall travel time, suggesting that additional mitigation may be needed, in the form of a procedure to allow aircraft to transit the new Tombstone MOA in a specific location and/or at specific altitudes, with specific types of coordination for safety. The impacts would apply to both IFR aircraft, and those VFR aircraft which choose to go around the MOA.

3.2.1.3 Civil Traffic

Approximately 17,600 civil aircraft flights annually traverse the entire area encompassing the proposed Tombstone MOA/ATCAA (which combines A, B, and C; lowers the floor to 100 feet AGL; and expands the northern boundary), during the proposed times of use (0600 to 2100 daily). Not all of these flights would be impacted by MOA operations as many of these occur in the space defined by the existing MOA.

Under Alternative 2 – Proposed Action, an exclusion would be established surrounding the Bisbee Douglas International airport below 13,000 feet MSL. Civil aircraft operations in the exclusion area or entering the exclusion area from the west side of the MOA would not be impacted under the Proposed Action. Thus, the airspace impact analysis for civil traffic focuses on the proposed northern expansion, the High North ATCAA, and the Low ATCAA. All other portions are existing SUA and would not be impacted by the Proposed Action.

Table 3.2-2 lists a sample of known civil aircraft included in the PDARs dataset for this MOA/ATCAA. The most common in this list are Airbus, Embraer, Boeing, Helicopter, and Piper variants. Approximately 25 percent of the total aircraft which transited the proposed MOA/ATCAA were unknown types. Assumptions for converting distance to time were that General Aviation traffic at lower altitudes were 170 kts, while Air Carrier traffic at higher altitudes were 330 kts.

Table 3.2-2 Aircraft Types Intersecting Proposed Tombstone MOA under Alternative 2

Aircraft Type	Distribution
Airbus	30%
Embraer	14%
Boeing	23%
Helicopter	9%
Piper	7%
Flight Design CT Series	2%
Cirrus	2%
Challenger	1%
Beechcraft	1%

Tombstone MOA Northern Expansion (SFC – FL180)

Approximately 2,900 annual civil flights traversed the proposed Tombstone MOA expansion during the proposed hours of use. The most frequent pairings were used to represent the impacts to the largest number of flights. Each row in **Table 3.2-3** shows an origin airport and destination airport (the return routes would be the opposite). In each row, there is the straight-line optimum route length (rounded to nearest NM). Then listed are one or two intermediate fixes or NAVAIDs that would be required to avoid the proposed airspace, and the distance for the route through those fixes. The difference in distance and time make up the final two columns. These most common routes vary in length from about 200 to over 1,300 NM. The average required change in distance would be 0–2 NM, and the average additional required time of travel is less than a minute. This additional travel time is expected to have a minimal impact.

Table 3.2-3 Potential Impacts to Civil Operations Due to Northern Expansion of Tombstone MOA

Origin/ Destination	GC Distance (NM)	Intermediate Fix	Distance via Intermediate Fix (NM)	Delta (NM)	Delta (minutes)
TUS-DFW	708 (via EWM)	MOLLY-EWM	708	<1	<1
TUS-ATL	1342 (via EWM)	MOLLY-EWM	1342	<1	<1
TUS-ELP	237	SSO	239	2	<1
ELP-GYR	319	n/a	n/a	0	0
ELP-IWA	286	n/a	n/a	0	0
ELP-FFZ	293	n/a	n/a	0	0
ELP-RYN	250	SSO	252	2	<1
ELP-SDL	304	n/a	n/a	0	0

Legend: ATL = Atlanta-Hartsfield; DFW = Dallas-Fort Worth; EL = El Paso; EWM = Newman; FFZ = Falcon Field (Mesa, AZ); GYR = Phoenix Goodyear, AZ; IWA = Phoenix-Mesa Gateway, AZ; MOLLY = fix; RYN = Ryan Field (Tucson, AZ); SDL = Scottsdale, AZ; SSO = San Simon; TUS = Tucson.

Tombstone Low ATCAA (FL180-FL230)

Approximately 1,200 annual civil flights traversed the proposed Low ATCAA in the northern Tombstone expansion during proposed hours of use. **Table 3.2-4** shows the origin-destination airport pairings accounting for the most frequent flights in the area. These routings are typical of the traffic through the general area, primarily east-west (or the reverse), with routing necessary to avoid the White Sands Missile Range to the east, and the various other SUA in Arizona and New Mexico. Since the traffic in this area already has to avoid other existing SUA, the typical routings often already go through El Paso or Newman, as such those routings were included in the baseline distances represented in this table instead of the straight-line distance. For the rerouting option, an additional fix was added to keep flights north of the proposed Low ATCAA. As shown, the additional rerouting adds no more than 2 NM and results in less than 1 minute of additional travel time.

Table 3.2-4 Potential Impacts to Civil Operations Due to Northern Expansion of Tombstone Low ATCAA

Origin/ Destination	GC Distance (NM)	Intermediate Fix	Distance via Intermediate Fix (NM)	Delta (NM)	Delta (minutes)
TUS-DFW	708 (via EWM)	MOLLY-EWM	708	<1	<1
TUS-IAH	811 (via ELP)	SSO-ELP	813	2	<1
TUS-ATL	1342 (via EWM)	SSO-EWM	1343	1	<1
TUS-HOU	819 (via ELP)	SSO-ELP	821	2	<1
TUS-DEN	607 (around SUA)	SSO-ONM	607	0	0
TUS-ORD	1260 (around SUA)	SSO-ONM	1260	0	0
TUS-MEM	1075 (via ELP)	SSO-ELP	1077	2	<1

Legend: ATL = Atlanta-Hartsfield; DEN = Denver; DFW = Dallas-Fort Worth; EL = El Paso; EWM = Newman; HOU = William P Hobby (Houston, TX); IAH = Houston; MEM = Memphis; MOLLY = fix; ONM = Socorro; ORD = Chicago O'Hare; SSO = San Simon; SUA = Special Use Airspace; TUS = Tucson.

Tombstone High North ATCAA (FL230 – FL510)

Approximately 8,100 annual civil flights traversed the proposed Tombstone North High ATCAA in the northern expansion during the proposed hours of use. **Table 3.2-5** shows the origin-destination airport pairings accounting for the most frequent flights in the area. The same factors apply to the east-west direction traffic as did for the northern portion of the Tombstone Low ATCAA discussed above. Another factor in this dataset are the various routes to Phoenix which cannot currently (very often) fly close to the straight-line route, but instead get routed to avoid other SUA. A great number of those routings currently pass just north of the Tombstone MOA/ATCAA, in the area where the MOA and ATCAA are proposed to expand north. These flights would still have to be routed around existing MOAs (such as the Outlaw and Jackal MOAs), to avoid the proposed Tombstone High ATCAA expansion. These are identified with a note in the table. In many cases, the new routing might be less than the current routing that touches the area of the proposed Tombstone High North ATCAA. If these flights were put on routings similar to the ones discussed for the proposed Low ATCAA, none of those changes result in variations of greater than 2 nm or more than 1 minute of flight time.

Table 3.2-5 Potential Impacts to Civil Operations Due to Northern Expansion of Tombstone High ATCAA

Origin/ Destination	GC Distance (NM)	Intermediate Fix	Distance via Intermediate Fix (NM)	Delta (NM)	Delta (minutes)
TUS-DFW	708 (via EWM)	MOLLY-EWM	708	<1	<1
TUS-IAH	811 (via ELP)	SSO-ELP	813	2	<1
AUS-SAN	1010	ELP-SSO	1010	<1	<1
MMUN-PHX	1530 (via ITEMM)	KUNRE-ITEMM	1534	4	1
TUS-HOU	819 (via ELP)	SSO-ELP	821	2	<1
TUS-ATL	1342 (via EWM)	SSO-EWM	1343	1	<1
TUS-MEM	1075 (via ELP)	SSO-ELP	1077	2	<1
MMMX-PHX	1089	n/a [1]	na	0	0
DFW-PHX	753	n/a [1]	na	0	0
AUS-PHX	757	n/a [1]	na	0	0
SAT-PHX	731	n/a [1]	na	0	0
ELP-PHX	306	n/a [1]	na	0	0
IAH-PHX	875	n/a [1]	na	0	0
AUS-SFO	1304	n/a [1]	na	0	0
DFW-SAN	1034 (via ELP-GBN)	n/a [1]	na	0	0
LAX-IAH	1196	n/a [1]	na	0	0

Note: [1]The shortest distance between points does not touch the proposed Tombstone High ATCAA extension. The data clearly shows that flights are routed through this airspace – meaning that they will continue to be routed nearby, with changes needed similar to the other routing adjustments indicated (through EWM or ELP, and SSO, adding up to 2 NM and less than a minute of time to the total trip).

Legend: ATL = Atlanta-Hartsfield; AUS = Austin; DFW = Dallas-Fort Worth; ELP = El Paso; EWM = Newman; HOU = William P Hobby (Houston, TX); IAH = Houston; ITEMM = fix; KUNRE = fix; LAX = Los Angeles; MEM = Memphis; MMMX = Mexico City; MMUN = Cancun, Mexico; MOLLY = fix; PHX = Phoenix Sky Harbor; SAN = San Diego; SAT = San Antonio; SFO = San Francisco; SSO = San Simon; TUS = Tucson.

3.2.2 Outlaw, Jackal MOAs/ATCAAs

3.2.2.1 Airports

Table 3.2-6 provides information for each of the public and private airports located beneath or in close proximity to the Outlaw and Jackal MOAs. **Figure 3.2-5** provides the location of these airports. Airports beneath the Morenci and Reserve MOAs are discussed only if they would be impacted by the proposed changes in the Outlaw and Jackal MOAs. There are no military airports in the ROI. There is one U.S. Forest Service emergency use only heliport beneath the Reserve MOA and in the vicinity of Jackal, it is not listed in the table. Detailed discussions of each publicly owned airport follow the table. Airport operations data provided in Table 3.2-6 was obtained from data reported to the FAA. Six private airports are within the ROI for the Outlaw and Jackal MOAs. Aircraft operating from private airports typically fly using VFR and at lower altitudes where radar coverage is limited or non-existent. As can be seen in **Table 3.2-6**, operational statistics are not available or not reported to the FAA for any of the private airports within the ROI.

Also necessary for the analysis of the Outlaw/Jackal MOAs are some of the airports east of Phoenix Sky Harbor International depicted in **Figure 3.2-6**. Not all airports shown in the figure are impacted and the figure serves to illustrate the proximity to the MOA.

Table 3.2-6 Airports in the Outlaw and Jackal MOAs ROI

Airport Name (Airport Code)[1]	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations
Superior Municipal Airport (E81), Superior, Arizona	Public	Outlaw	Outlaw	None Reported	GA Itinerant = 200
San Carlos Apache Airport (P13), Globe, Arizona	Public	Outlaw	Outlaw	2 Single Engine	GA Local = 400 GA Itinerant = 1500
Kearny Airport (E67), Kearny, Arizona	Public	Outlaw	Outlaw	3 Single Engine 1 Ultralight	GA Local = 250 GA Itinerant = 1100 Military = 200
Coolidge Municipal Airport (P08)[1], Coolidge, Arizona	Public	Outlaw	Outlaw	14 Single Engine 24 Multi Engine 3 Helicopters 1 Ultralight	GA Local = 40,000 GA Itinerant = 25,000 Military = 50
San Manuel Airport (E77)[1], San Manuel, Arizona	Public	Outlaw	Outlaw	15 Single Engine 1 Helicopter	GA Local = 12,000 GA Itinerant = 2,000 Military = 300
Safford Regional Airport (SAD), Safford, Arizona	Public	Jackal	Jackal	26 Single Engine 19 Multi Engine 1 Jet 1 Helicopter	Air Taxi = 150 GA Local = 6,000 GA Itinerant = 6,600 Military = 1,000
Flying J Ranch Airport (E37), Pima, Arizona	Public	Jackal Low	Jackal	8 Single Engine 1 Multi-Engine 1 Ultralight	GA Local = 500 GA Itinerant = 50 Military = 25
Whiteriver Airport (E24), Whiteriver, Arizona	Public	Jackal	Jackal	None Reported	GA Local = 850 GA Itinerant = 3,000 Military = 60
Greenlee County Airport (CFT)[1], Clifton, Arizona	Public	Jackal/Morenci	Jackal/Morenci	1 Single Engine	Air Taxi = 200 GA Local = 200 GA Itinerant = 900 Military = 50

Airport Name (Airport Code)[1]	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations
Grapevine Airstrip Airport (88AZ)[1], Roosevelt, Arizona	Private	Outlaw	Outlaw	None Reported	None Reported
Regeneration Airport (5AZ9), Fort Thomas, Arizona	Private	Jackal	Jackal	None Reported	None Reported
High Mesa Airpark Airport (3AZ8)	Private	Jackal	Jackal	None Reported	None Reported
China Peak Observatory Airport (AZ45), Klondyke, Arizona	Private	Jackal Low	Jackal	None Reported	None Reported
Av Ranch Airport (AN01), Klondyke, Arizona	Private	Jackal Low	Jackal	None Reported	None Reported
Double Circle Ranch*	Private	Jackal/Reserve	Jackal/Reserve	None Reported	None Reported

Notes: [1]Airports outside of the lateral boundaries of the MOA
Legend: MOA = Military Operations Area; ROI = Region of Influence; GA = General Aviation.
Source: SkyVector 2023.

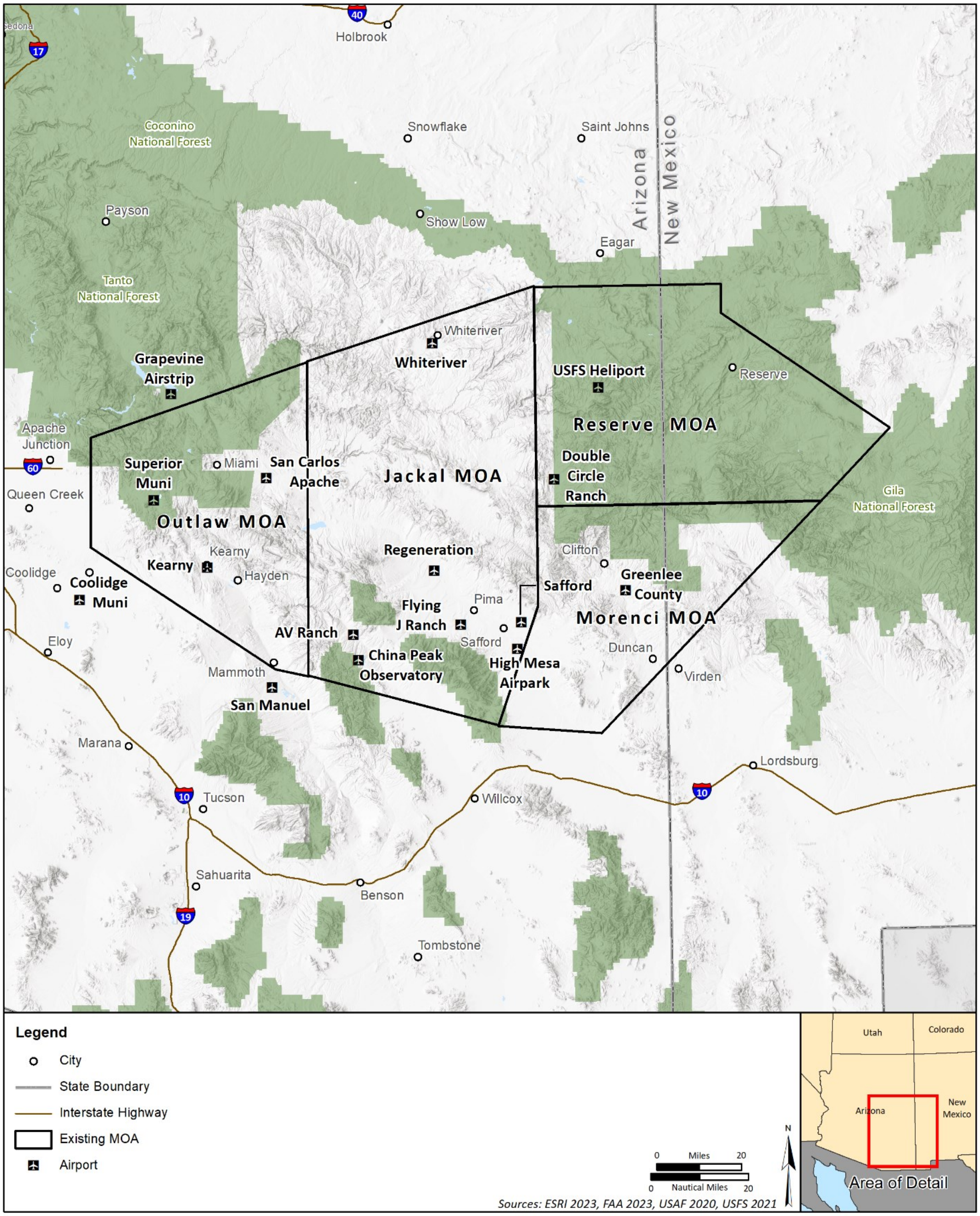


Figure 3.2-5 Airports in the Outlaw and Jackal MOAs ROI

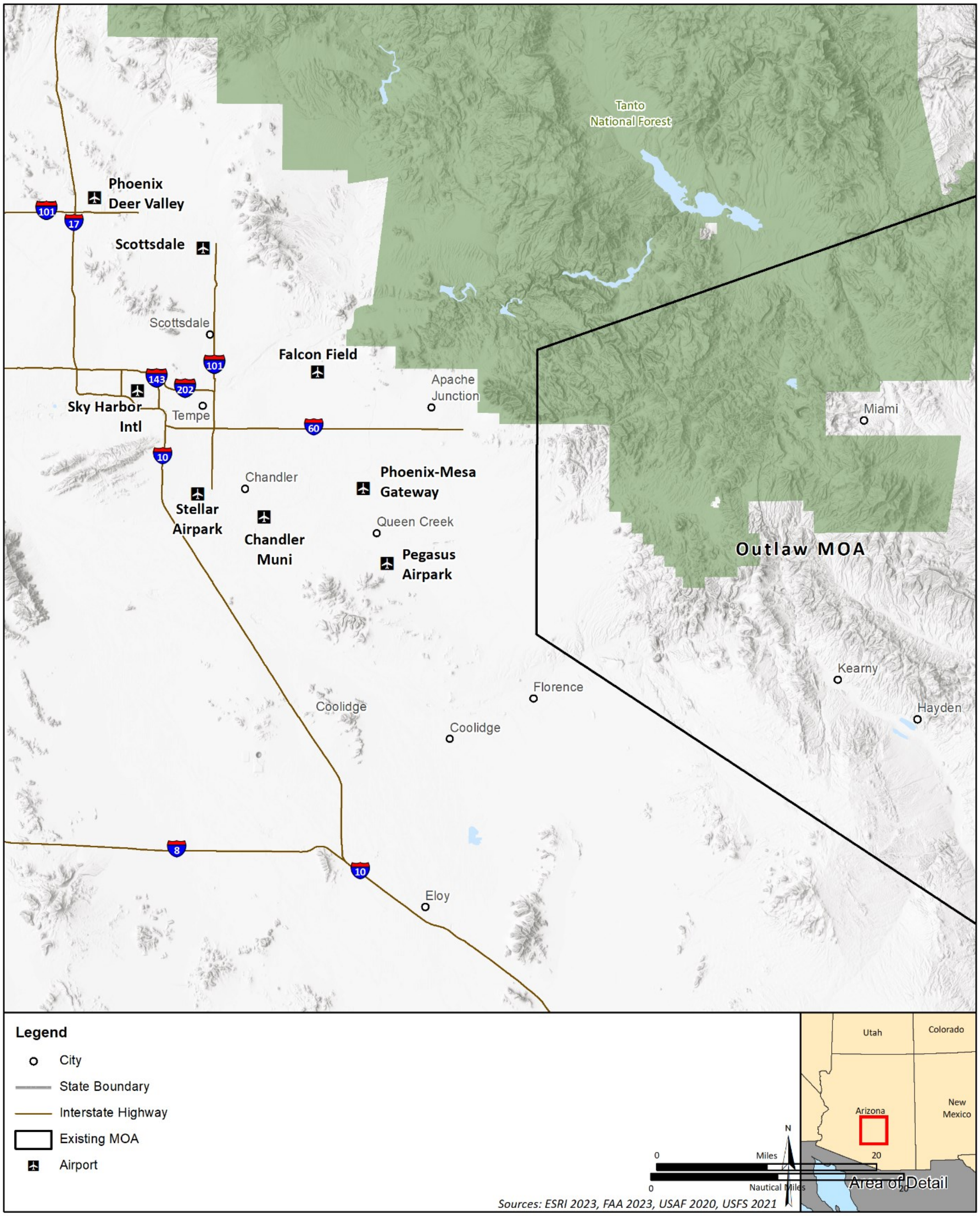


Figure 3.2-6 Phoenix Area Airports

Superior Municipal Airport (E81), Superior, Arizona, is located 2 miles southwest of Superior, Arizona and beneath the existing Outlaw MOA. The airport, publicly owned by the Town of Superior, is a non-towered airport with communications provided on an advisory frequency. Superior Municipal Airport is a general aviation airport, and no commercial services are offered. The airport is located within Class G airspace. The airport has one runway, Runway 4/22, and has no published instrument approaches. There were 200 airport operations reported to the FAA for the 12-month period ending April 18, 2023 (SkyVector 2023).

San Carlos Apache Airport (P13), Globe, Arizona, is located 7 miles southeast of Globe, Arizona and is located beneath the existing Outlaw MOA. The airport, publicly owned by the San Carlos Apache Tribe, is a non-towered airport with approach/departure services provided by Albuquerque ARTCC. San Carlos Apache Airport is a general aviation airport and no commercial flight services are offered. The airport is located within Class E airspace that extends upward from 700 feet AGL within an 8-mile radius of the airport with an extension east into the Jackal MOA. San Carlos Apache has one runway, Runway 9/27, with a published instrument approach to Runway 27. There were 1,900 airport operations reported to the FAA for the 12-month period ending April 16, 2021 (SkyVector 2023).

Kearny Airport (E67), Kearny, Arizona, is located 1 mile south of Kearny, Arizona and beneath the existing Outlaw MOA. The airport, publicly owned by the Town of Kearny, is a non-towered airport with communications provided on an advisory frequency. Kearny Airport is a general aviation airport and no commercial flight services are offered. The airport is located within Class G airspace. The airport has one runway, Runway 8/26, and has no published instrument approaches. There were 1,550 airport operations reported to the FAA for the 12-month period ending April 18, 2023 (SkyVector 2023).

Coolidge Municipal Airport (P08), Coolidge, Arizona, is located 5 miles southeast of Coolidge, Arizona and 11 miles outside the southwestern boundary of the existing Outlaw MOA. The airport, publicly owned by the City of Coolidge, is a non-towered airport with approach/departure service provided by Albuquerque ARTCC. Coolidge Airport is a general aviation airport, and no commercial services are offered. The airport is located within Class E surface area encompassing the region in the vicinity of Phoenix Sky Harbor International Airport. Coolidge has two runways, Runway 5/23 and Runway 17/35 with published instrument approaches to Runways 5/23. There were 65,050 airport operations reported to the FAA for the 12-month period ending April 18, 2023 (SkyVector 2023).

San Manuel Airport (E77), San Manuel, Arizona, is located 2 miles northwest of San Manuel, Arizona and outside the southeastern boundary of the existing Outlaw MOA. The airport, publicly owned by Pinal County, is a non-towered airport with communications provided on an advisory frequency. San Manuel Airport is a general aviation airport, and no commercial services are offered. The airport offers pilot instruction services. The airport is located within Class G airspace. San Manuel has one runway, Runway 11/29, and has no published instrument approaches to. There were 14,300 airport operations reported to the FAA for the 12-month period ending April 13, 2023 (SkyVector 2023).

Safford Regional Airport (SAD), Safford, Arizona, is located 3 miles east of Safford, Arizona and beneath the existing Jackal MOA. The airport, publicly owned by the City of Safford, is a non-towered airport with approach departure service provided by Albuquerque ARTCC. Safford is a general aviation airport and no commercial services are offered. The airport offers air ambulance and charter services, pilot instruction and aircraft rentals. The airport is located with Class E airspace that extends 700 feet AGL and above within an 6mile radius of the airport and into the Morenci MOA. The Class E airspace excludes the airspace 1,500 to 5,000 feet AGL beneath the Morenci MOA. Safford Regional has two runways, Runway 12/30 and Runway 8/26 with instrument approaches published to Runways 12/30. There were 13,705 airport operations reported to the FAA for the 12-month period ending April 18, 2018 (SkyVector 2023).

Flying J Ranch Airport (E37), Pima, Arizona, is located 4 miles southwest of Pima, Arizona and beneath the existing Jackal Low MOA. The airport, publicly owned by Howard E Jenkins, is a non-towered airport with communications provided on an advisory frequency. Flying J Ranch is a general aviation with no commercial services offered. The airport is located in Class G airspace and excludes the airspace 1,500 feet AGL and below within 3-mile radius of the airport beneath the Jackal Low MOA. Flying J Ranch has two dirt runways, Runway 18/26 and Runway 7/25, with no published instrument approaches. There were 575 operations reported to the FAA for a 12-month period ending April 17, 2021 (SkyVector 2023).

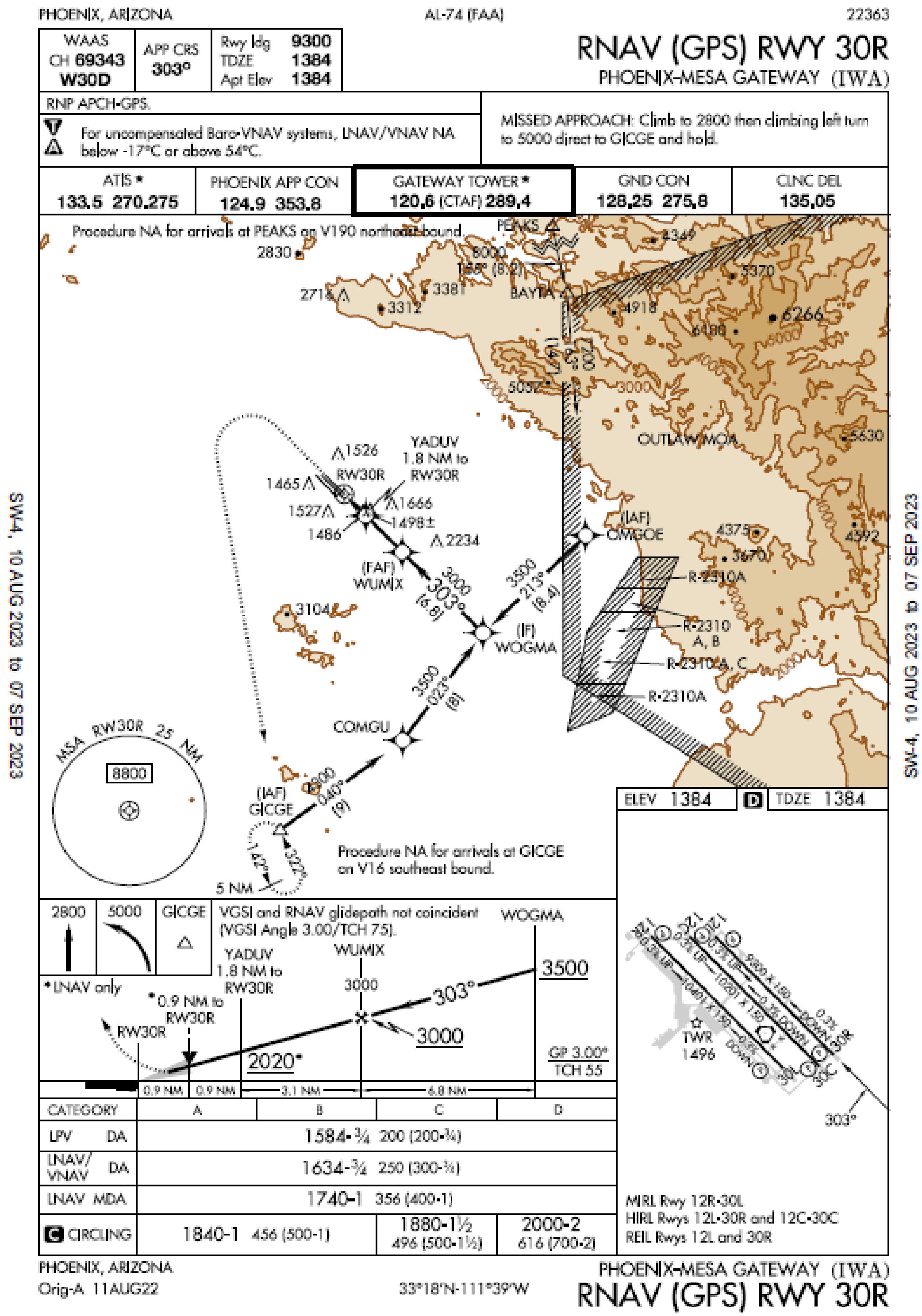
Whiteriver Airport (E24), Whiteriver, Arizona, is located 1 mile southwest of Whiteriver, Arizona beneath the existing Jackal MOA. The airport, publicly owned by the White Mountain Apache Tribe, is a non-towered airport with communications provided on an advisory frequency. Whiteriver Airport is a general aviation airport with no commercial services offered. The airport is located within Class E airspace 700 feet AGL and above. Whiteriver Airport has one runway, Runway 1/19, and has no published instrument approaches. There were 3,910 airport operations reported to the FAA for the 12-month period ending April 8, 2021 (SkyVector 2023).

Under the Proposed Action, instrument approaches into Phoenix-Mesa Gateway (IWA) and Coolidge Municipal (P08) Airports would be impacted when the MOA is active. The Runway 30R RNAV (global positioning system [GPS]) approach to IWA has an initial approach fix (OMGOE) which is approximately 2 miles inside the boundary and beneath the proposed Outlaw MOA (**Figure 3.2-7**).

The Runway 23 RNAV (GPS) approach into P08 uses an initial approach fix (BOCPO) which is on the southern boundary of Outlaw and another fix (DARAY) approximately 1 mile inside the southern boundary of the Outlaw MOA (**Figure 3.2-8**). This approach has an established standard holding pattern which extends to the northeast of DARAY at 5,800 feet MSL. Aircraft requiring these approaches would need to use a different initial approach fix if available for the approach during times when the SUA is active.

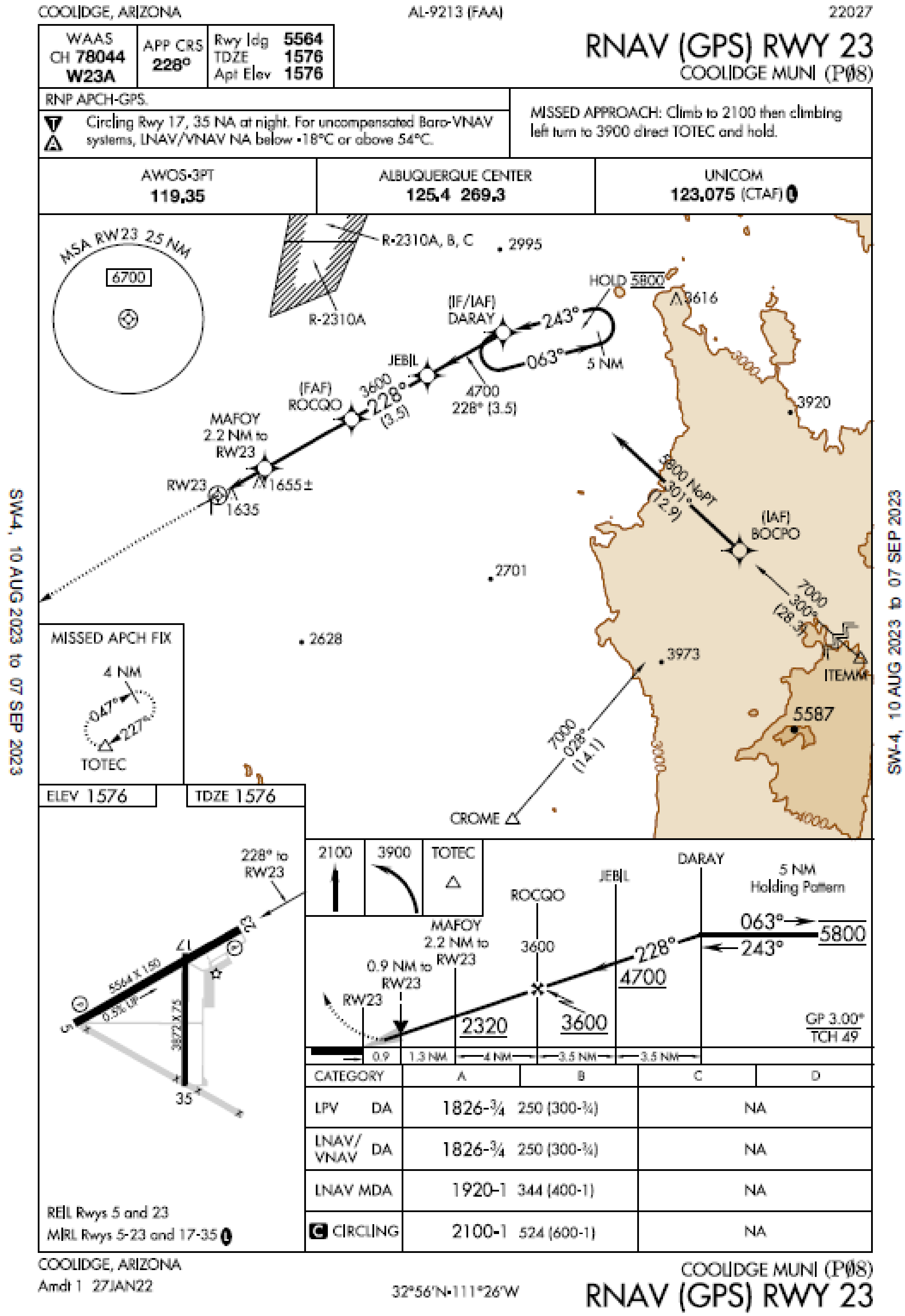
The Runway 12 RNAV (GPS) approach to SAD is the only published instrument approach procedure to Runway 12 and traverses the existing Jackal Low MOA (**Figure 3.2-9**). BAXKU is one of two initial approach fixes for this approach and is outside of the north boundary of Jackal Low. Lowering the floor in Jackal would make this approach unusable when the MOA is active. Additionally, the missed approach procedure for the Runway 30 RNAV (GPS) to Safford, uses the fix ARUJU to track to the holding fix (CIBBI), ARUJU is beneath the existing Jackal MOA (**Figure 3.2-10**). During times when the existing Jackal Low is active, alternate instructions for these approaches are assigned (e.g., alternate missed instructions).

Safford Regional Airport is surrounded by Class E airspace with an existing exclusion of 1,500 feet AGL in a portion of the airspace beneath the Jackal and adjacent Morenci MOA. Under the Proposed Action, a procedure would need to be established to permit traffic to arrive and depart SAD safely during MOA use.



Source: SkyVector 2023.

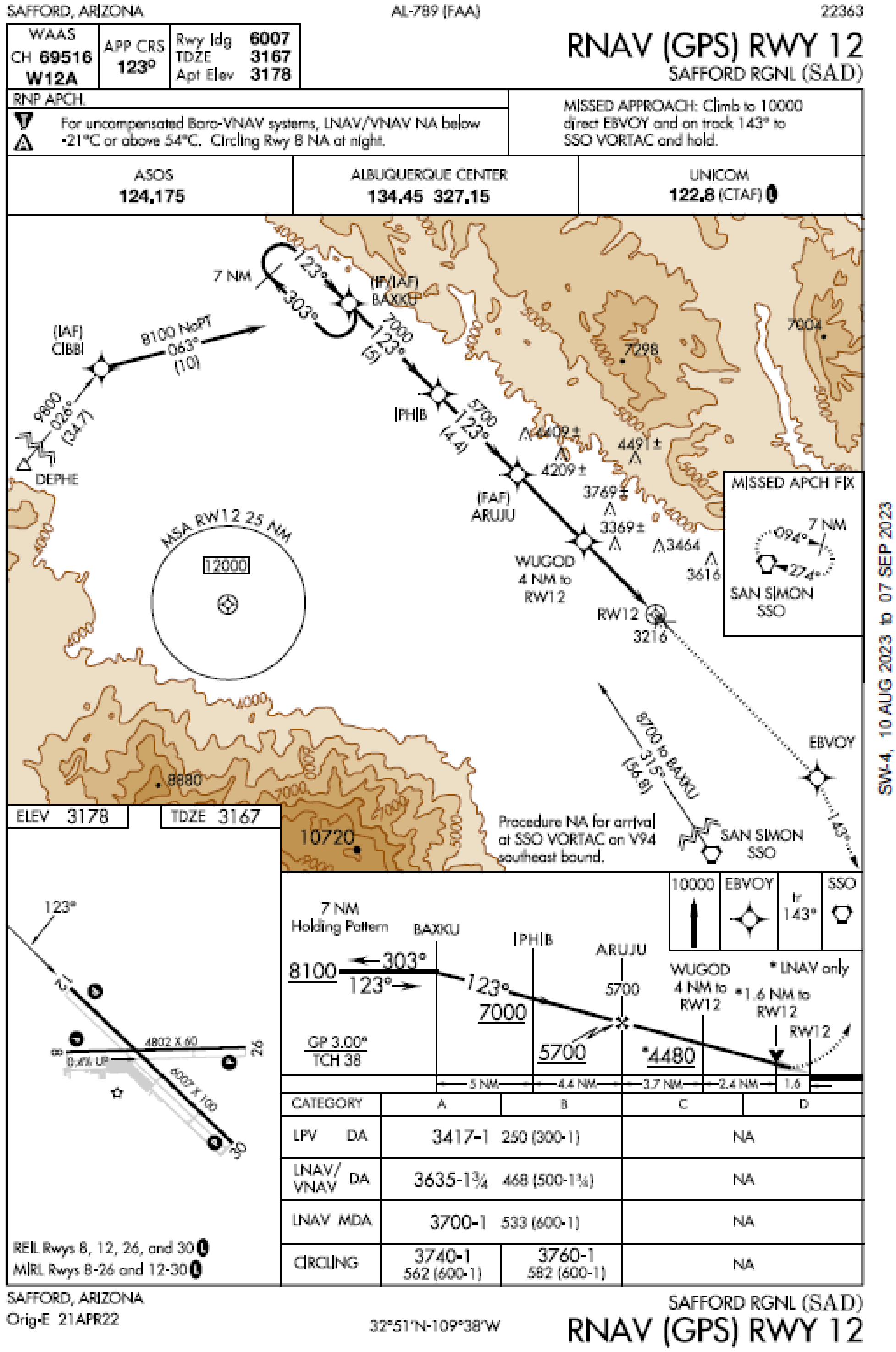
Figure 3.2-7 Phoenix Mesa Gateway RNAV (GPS) Runway 30R



CATEGORY	A	B	C	D
LPV DA	1826-¾ 250 (300-¾)		NA	
LNAV/VNAV DA	1826-¾ 250 (300-¾)		NA	
LNAV MDA	1920-1 344 (400-1)		NA	
CIRCLING	2100-1 524 (600-1)		NA	

Source: SkyVector 2023.

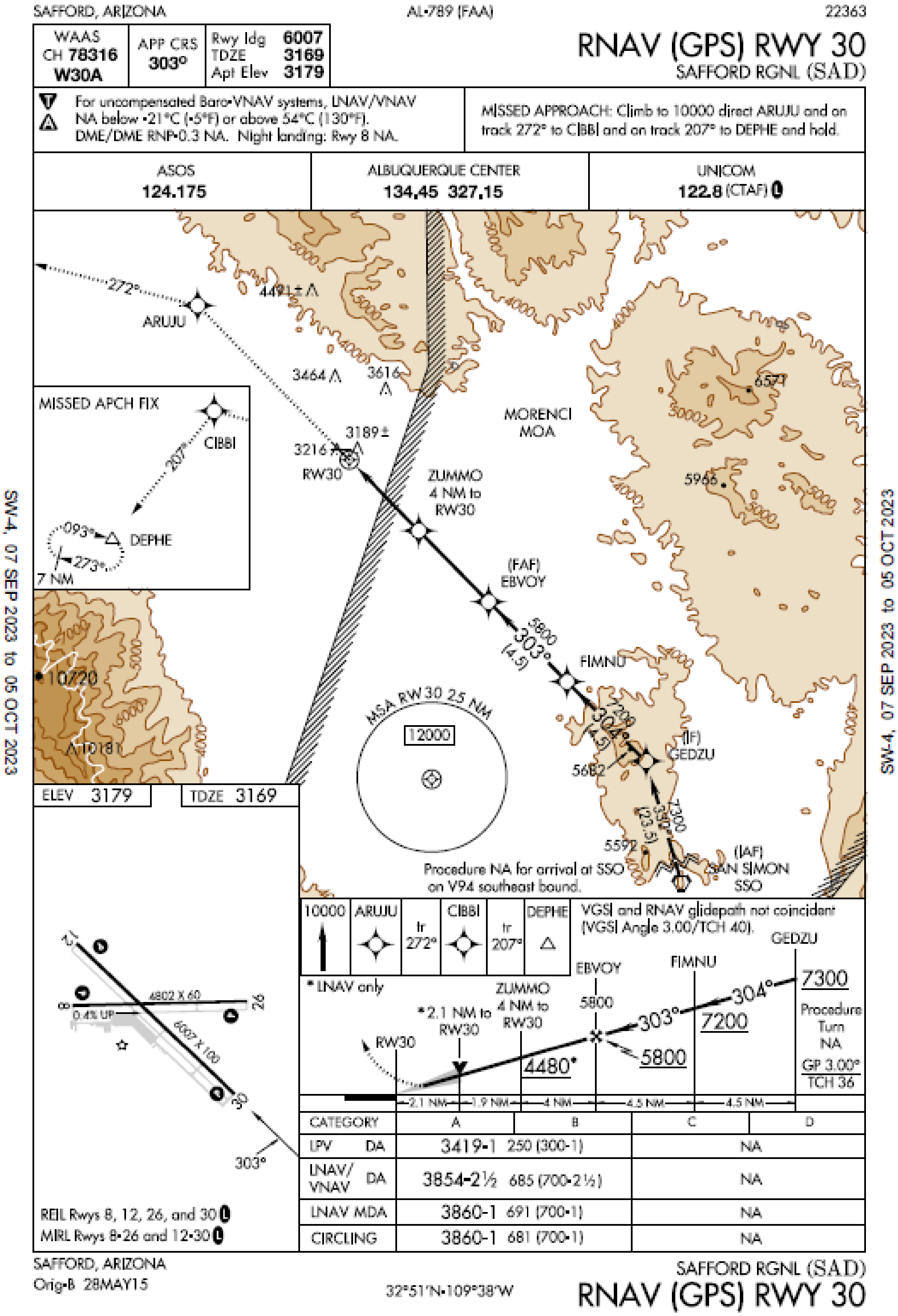
Figure 3.2-8 Coolidge Municipal RNAV (GPS) Runway 23



CATEGORY	A	B	C	D
LPV DA	3417-1 250 (300-1)		NA	
LNAV/VNAV DA	3635-1¾ 468 (500-1¾)		NA	
LNAV MDA	3700-1 533 (600-1)		NA	
CIRCLING	3740-1 562 (600-1)	3760-1 582 (600-1)	NA	

Source: SkyVector 2023.

Figure 3.2-9 Safford Regional RNAV (GPS) Runway 12



Source: SkyVector 2023.

Figure 3.2-10 Safford Regional RNAV (GPS) Runway 30

There are at least three standard arrival and departure procedures at Phoenix Sky Harbor International Airport which would be impacted by the proposed changes in the Outlaw and Jackal MOAs. Phoenix Sky Harbor International Airport is not included in the ROI due to its distance from the MOA boundary. These procedures either traverse the airspace or have fixes close enough to the MOA boundary where airspace separation would be affected. These procedures would need to be redesigned or modified to remain clear of the MOAs when they are active. These procedures are not detailed in this analysis and this information is included for awareness.

3.2.2.2 ATS Routes

There are no ATS routes that traverse the Outlaw and Jackal MOAs. There are ATS routes that traverse the ATCAAs: J-4, J-184, J-65 and J-86, J18-102 (**Figure 3.2-11**). The MEAs for these routes are between FL180 and FL270. These routes are only affected by the active Outlaw and Jackal ATCAAs. The dimensions of the ATCAAs would remain unchanged, thus there would be no change to the current conditions. V-190 runs parallel to the northern boundary of the MOA and V-94 runs parallel to the southern boundary. These airways sequence traffic into the Phoenix Sky Harbor International Airport area. There are two RNAV waypoints within the Outlaw airspace, OBULL, and ONRTH. There are no proposed changes to the upper altitudes or dimensions of the ATCAAs under the Proposed Action, thus impacts to navigation via these waypoints would not occur.

3.2.2.3 Civil Traffic

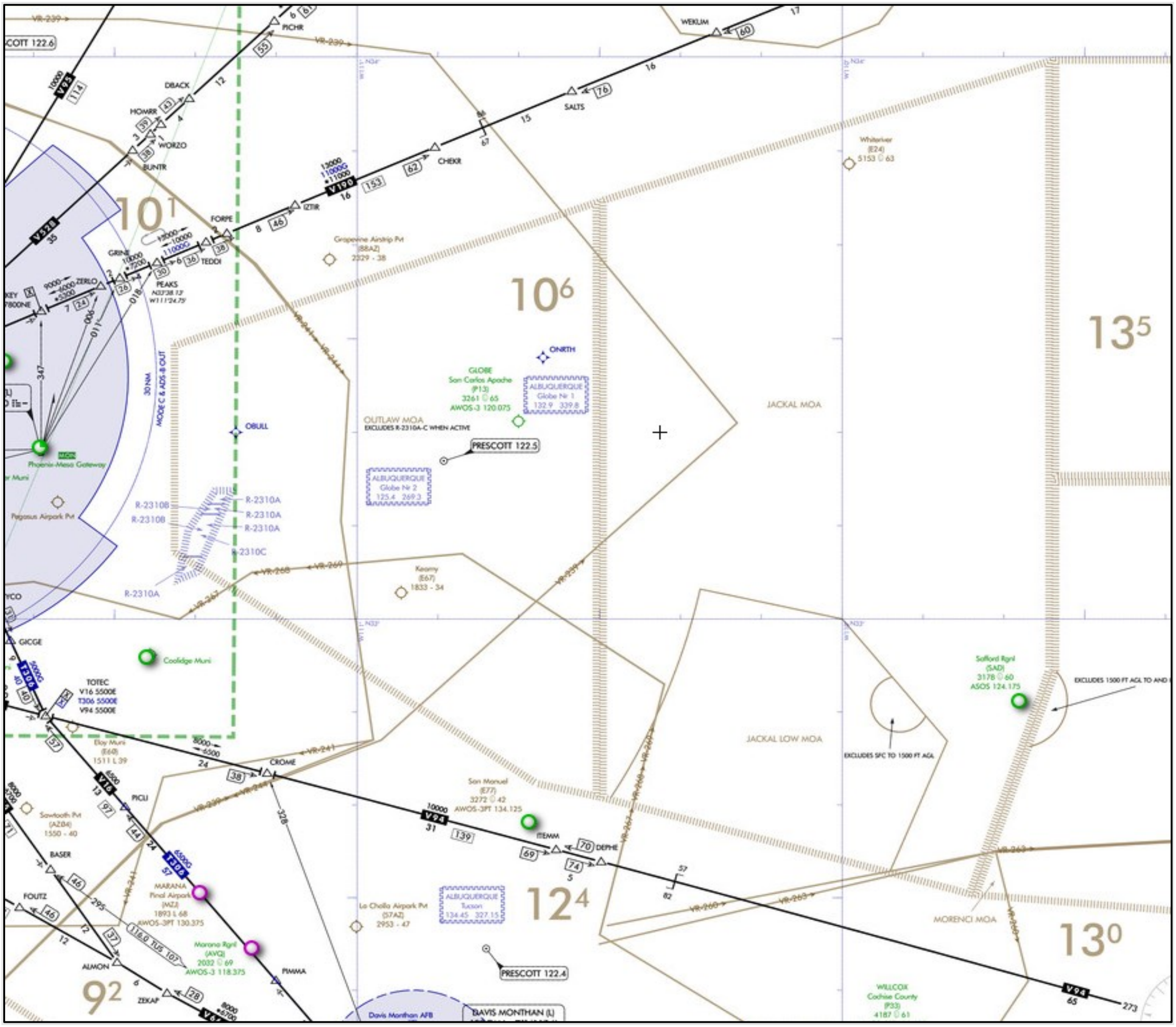
MOA Traffic (Below FL180)

Approximately 25,500 civil aircraft flights occurred annually within the proposed Outlaw/Jackal MOAs beneath 11,000 feet MSL during the proposed times of use (0600 to 2200, Monday through Friday) and a large majority of those operations (approximately 80 percent) were beneath Outlaw MOA. Not all of these flights would be affected by military operations in the proposed MOA.

Table 3.2-7 lists a sample of known civil aircraft included in the PDARS dataset for these MOAs. The most common in this list are Piper, Cessna, Helicopter, and Beechcraft variants. Aircraft not listed in the table were in the MOA less than 3 percent of the time. Approximately 13 percent of the total aircraft which transited the SUA were unknown types.

Table 3.2-7 Aircraft Types Intersecting Proposed Outlaw/Jackal MOA under Alternative 2

Aircraft Type	Distribution
Piper	28%
Cessna	21%
Helicopter	12%
Beechcraft	6%
E300	3%
Airbus	3%
Cirrus	3%



Source: SkyVector 2023.

Figure 3.2-11 Outlaw and Jackal ATCAAs ATS Routes

An analysis of the pairings revealed that most of the flight tracks in this dataset were originating and departing from the same four locations southeast of Phoenix Sky Harbor International Airport (Falcon Field Airport, Phoenix-Mesa Gateway Airport, Chandler Municipal Airport, and Safford Regional Airport). The vast majority of the aircraft activity were flights taking off from one of these airports, flying beneath the Outlaw/Jackal MOA, and returning to the same airport. Very few of these flights were passing through the airspace going to a further destination. Thus an analysis for rerouting flights was not meaningful in this situation.

Approximately 84 percent of the traffic operated VFR. Aircraft operating in this space were most frequently landing or departing Falcon Field Airport (FFZ), Phoenix-Mesa Gateway Airport (IWA), Chandler Municipal Airport (CHD), Scottsdale Airport (SDL), and Safford Regional Airport (SAD). Four of these airports (FFZ, IWA, CHD and SDL) are not considered to be in the ROI for the Outlaw and Jackal MOAs but had high frequency of utilization for flights transiting the MOA (**Table 3.2-8**). It should be noted that all of these airports offer pilot instruction services or have flight training schools; therefore, the number of student pilots or training activities among general aviation operations would be expected to be high. The type of aircraft listed in **Table 3.2-7** support this assumption.

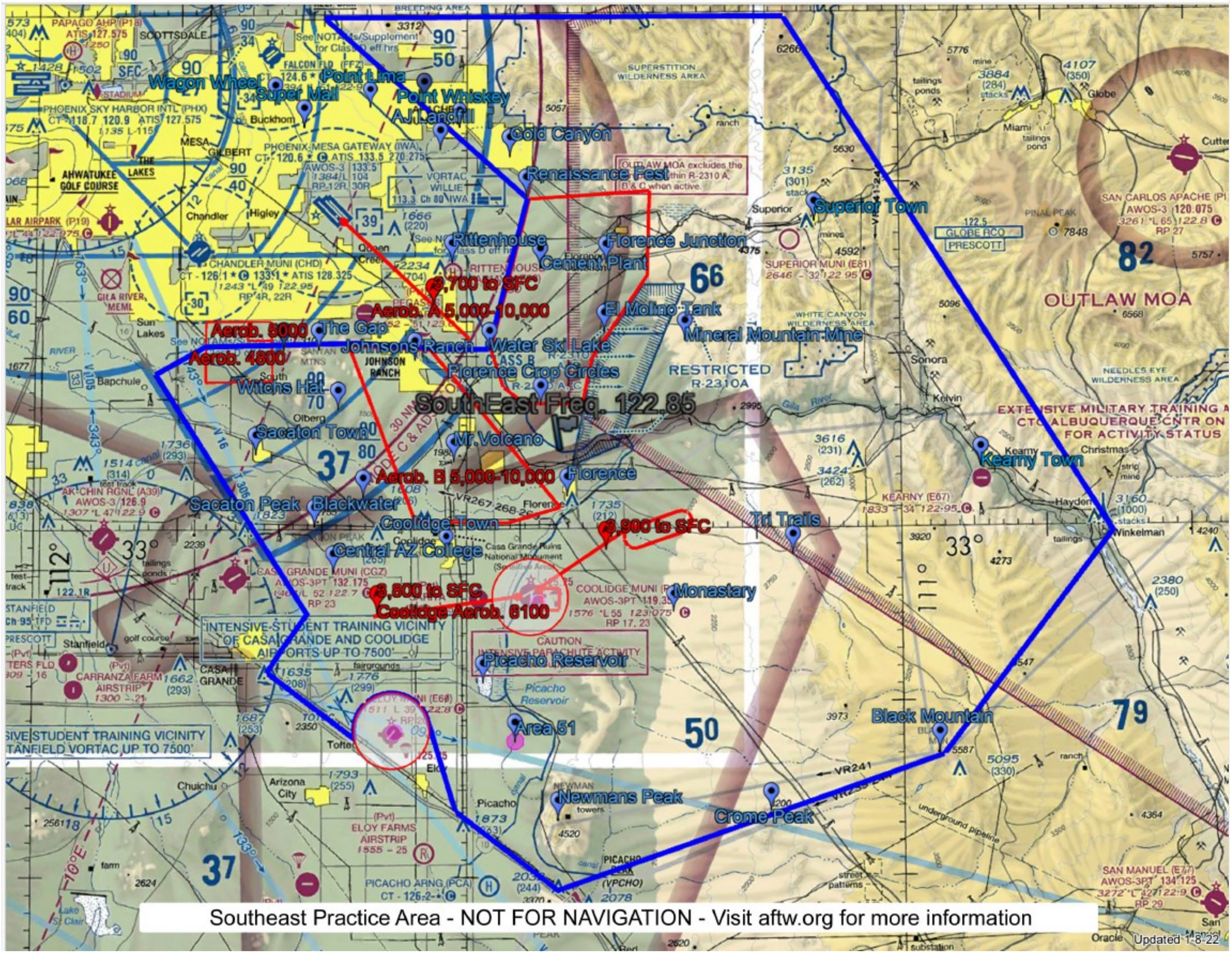
Figure 3.2-12 depicts the Practice Area southeast of Phoenix published by the Arizona Flight Training Working Group (2022). A segment of this Practice Area is beneath the lateral boundaries of the existing Outlaw MOA (additional practice areas to the north and northwest of Phoenix are not included in this analysis). This analysis does not include specific information on flight school or training operations, and only notes their proximity and potential interaction with the MOAs. VFR traffic operating from these airports, and utilizing the VFR airspace beneath the current Outlaw MOA would be displaced by lowering the floor of the MOA under the Proposed Action.

Table 3.2-8 Airports Outside Outlaw/Jackal ROI with High Frequency Use

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations
Falcon Field Airport (FFZ), Mesa, Arizona	Public	Outlaw/Jackal	Outlaw/Jackal	516 Single Engine 76 Multi-Engine 8 Jet 37 Helicopters 1 Gliders	Commercial = 1 Air Taxi = 72,258 GA Local = 182,216 GA Itinerant = 56,550 Military = 3,142
Phoenix-Mesa Gateway Airport (IWA), Phoenix, Arizona	Public	Outlaw/Jackal	Outlaw/Jackal	21 Single Engine 38 Jet 13 Helicopter	Commercial = 13,139 Air Taxi = 34,885 GA Local = 154,286 GA Itinerant = 47,378 Military = 4,911

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations
Chandler Municipal Airport (CHD), Chandler, Arizona	Public	Outlaw/Jackal	Outlaw/Jackal	320 Single Engine 32 Multi-Engine 8 Jet 23 Helicopter 1 Glider 1 Ultralight	Air Taxi = 4,240 GA Local = 145,830 GA Itinerant = 88,790 Military = 440
Scottsdale Airport (SDL)	Public	Outlaw/Jackal	Outlaw/Jackal	167 Single Engine 26 Multi-Engine 137 Jet 26 Helicopter	Air Taxi = 16,610 GA Local = 65,430 GA Itinerant = 119,917 Military = 607

Legend: GA = General Aviation
Source: SkyVector 2023.



Source: Arizona Flight Training Working Group 2022.

Figure 3.2-12 Phoenix Southeast Practice Area

The most frequent pairings not beginning or ending in the same location were to Safford Regional Airport (SAD). There were approximately 530 operations arriving or departing SAD in the dataset considered. Safford Regional Airport is surrounded by Class E airspace with an exclusion of 1,500 feet AGL in a portion of the airspace beneath the Jackal and adjacent Morenci MOA. Under the Proposed Action, a procedure would need to be established to permit traffic to arrive and depart SAD safely during MOA use. Since the pairings were predominately to westbound (or returning) routes, expanding the existing Class E airspace to the southwest and the existing exclusion would mitigate potential impacts. This would establish a means of arrival and departure to the airport beneath the proposed MOA.

ATCAA Traffic (FL180-FL510)

The Proposed Action does not include changes to the dimensions or altitudes of the Outlaw or Jackal ATCAAs, but would amend the existing letter of agreement (LOA) between the DAF and FAA to allow default scheduling of the Outlaw and Jackal ATCAAs to FL510 (currently defaults to FL290) without having to schedule the adjacent Morenci and Reserve ATCAAs. The existing LOA allows aircraft in Jackal to be assigned altitudes above FL290 when the Rustler ATCAA is active. This is existing ATCAA and operations above FL290 would be addressed in the LOA.

3.2.3 Bagdad and Gladden MOAs

3.2.3.1 Airports

Table 3.2-9 provides information for each of the public and private airports located beneath or in close proximity to Bagdad and Gladden MOAs. **Figure 3.2-13** provides the location of these airports**.** There are no military airports within the ROI for the Bagdad and Gladden MOAs. Detailed discussions of each publicly owned airport follow the table. The airport operations data provided in **Table 3.2-9** was obtained from data reported to the FAA. Ten private airports lie within the ROI for the Bagdad and Gladden MOAs. Aircraft operating from private airports typically fly using VFR and at lower altitudes where radar coverage is limited or non-existent. As can be seen in **Table 3.2-9**, operational statistics are not available or not reported to the FAA for any of the private airports within the ROI. The Proposed Action would not impact any instrument approach procedures at these airports.

Table 3.2-9 Airports in the Bagdad and Gladden MOAs ROI

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations[1]
Bagdad Airport (E51), Bagdad, Arizona	Public	Bagdad	Bagdad	3 Single Engine	GA Local = 400 Ga Itinerant = 600
Lake Havasu City Airport (HII)[1], Lake Havasu, Arizona	Public	Bagdad	Bagdad	121 Single Engine 13 Multi-Engine 7 Jet 7 Helicopters 9 Ultralights	Air Taxi = 1,900 GA Local = 24,000 GA Itinerant = 25,000 Military = 2,000

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations[1]
Prescott Regional – Ernest A. Love Field Airport (PRC)[1], Prescott, Arizona	Public	Bagdad/Gladden	Bagdad/Gladden	214 Single Engine 16 Multi-Engine 3 Jet 29 Helicopters 1 Glider	Commercial = 6 Air Taxi = 53,715 GA Local = 217,368 GA Itinerant = 39,563
Wickenburg Municipal Airport (E25)[1], Wickenburg, Arizona	Public	Gladden	Gladden	12 Single Engine 1 Multi-Engine 1 Glider 2 Ultralights	GA Local = 11,500 GA Itinerant =24,200 Military = 50
Sagebrush Trails Estates Airport (9AZ2)[1], Lake Havasu City, Arizona	Private	Bagdad	Bagdad	None Reported	None Reported
Massey Farm Airport (AZ34)[1], Yucca, Arizona	Private	Bagdad	Bagdad	None Reported	None Reported
Moreton Airpark Airport (23AZ)[1], Wickenburg, Arizona	Private	Gladden	Gladden	None Reported	None Reported
Eagle Roost Airpark Airport (27AZ), Aguila, Arizona	Private	Gladden	Gladden	None Reported	None Reported
Outback Ranch Airstrip Airport (AZ01)	Private	Gladden	Gladden	None Reported	None Reported
Flying Dares Ranch Airport (26AZ)	Private	Gladden	Gladden	None Reported	None Reported
Sampleys Airport (28AZ), Aguila, Arizona	Private	Gladden	Gladden	None Reported	None Reported

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations[1]
Indian Hills Airpark Airport (2AZ1)[1], Salome, Arizona	Private	Gladden	Gladden	None Reported	None Reported
Western Sky Airpark Airport (0AZ2)[1], Salome, Arizona	Private	Gladden	Gladden	None Reported	None Reported
Jalapeño Ranch Airport (62AZ)[1], Bouse, Arizona	Private	Gladden	Gladden	None Reported	None Reported

Notes: [1]Airports outside of the lateral boundaries of the MOA
Legend: MOA = Military Operations Area; ROI = Region of Influence; GA = General Aviation.
Source: SkyVector 2023.

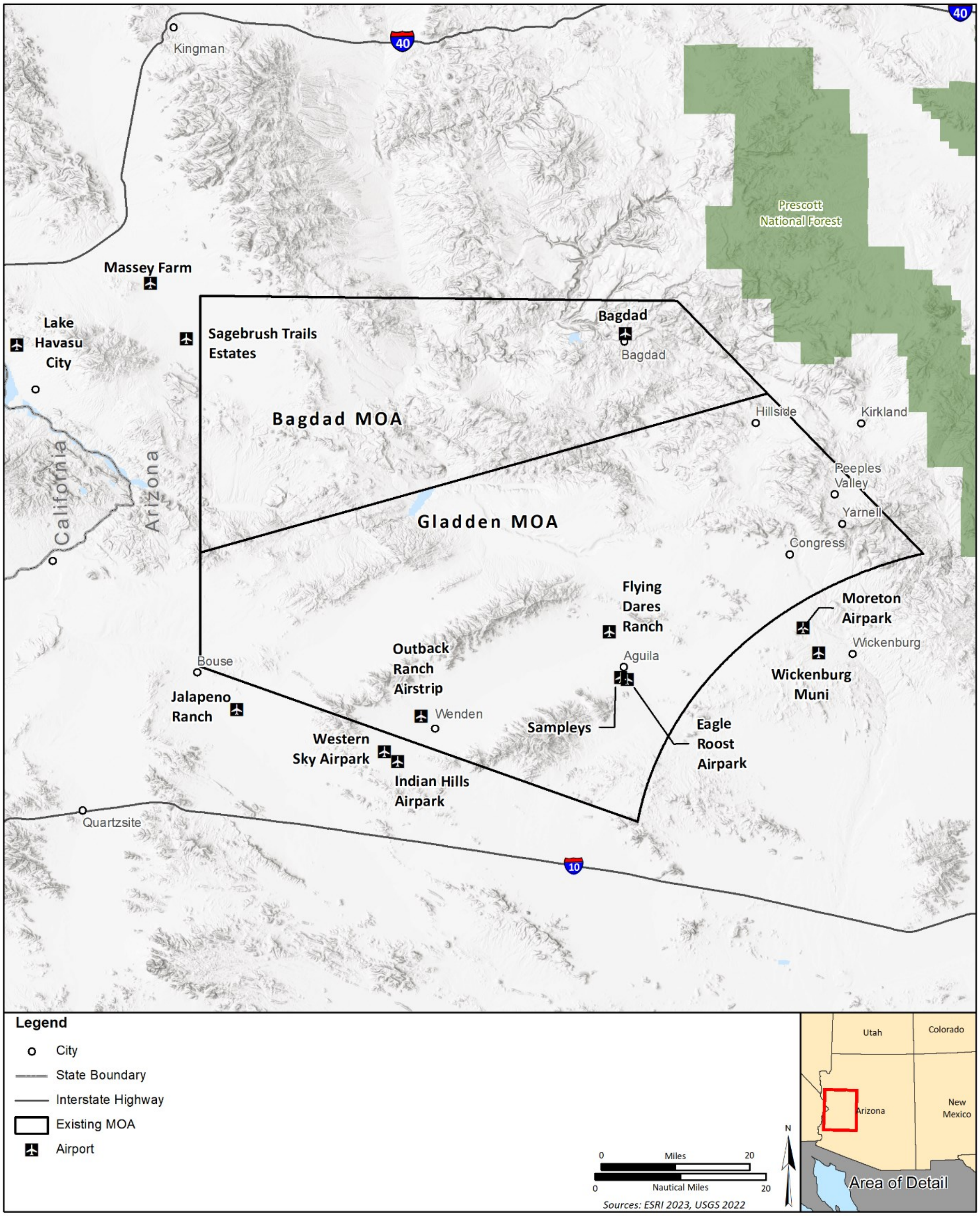


Figure 3.2-13 Airports in the Bagdad and Gladden MOAs ROI

Bagdad Airport (E51), is located 2 miles northeast of Bagdad, Arizona beneath the northeastern quadrant of the existing Bagdad MOA. The airport, publicly owned by Yavapai County, is a non-towered airport with communications provided by Prescott Radio or the Bagdad Remote Communication Outlet (RCO). Bagdad Airport is a general aviation airport and no commercial flight services are offered. The airport is located within Class G, uncontrolled airspace. Bagdad has one runway, Runway 5/23, and does not have published instrument approaches. There were 1,000 airport operations reported to the FAA for the 12-month period ending May 13, 2022; reported operations were all local or itinerant general aviation flights (SkyVector 2023).

Lake Havasu City Airport (HII), is located 6 miles north of Lake Havasu, Arizona and approximately 18 miles outside the northwestern boundary of the Bagdad MOA and beneath the existing Turtle MOA (11,000 MSL to FL180). The airport, publicly owned by Lake Havasu City, is a non-towered airport with approach/departure control service provided by Los Angeles ARTCC. Lake Havasu City Airport is a general aviation airport and commercial flight services are not offered. The airport offers air freight, air ambulance, avionics, charter, pilot instruction and aircraft rental services. The airport is located within Class E airspace that extends upward from 700 feet AGL within 5-mile radius of the airport with a narrow southeast extension. Lake Havasu City has one runway, Runway 14/32, with published instrument approaches to both runways. There were 52,900 operations reported to the FAA for the 12-month period ending May 16, 2022 (SkyVector 2023).

Prescott Regional – Ernest A. Love Field Airport (PRC), is located 7 miles north of Prescott, Arizona and approximately 17 miles northeast of the eastern boundary of the Bagdad/Gladden MOAs. The airport, publicly owned by the City of Prescott, is a towered airport with approach/departure control service provided by Phoenix TRACON. Prescott is a commercial services airport and offers, airfreight, avionics, cargo handling, charter, pilot instruction, and aircraft rental and sales services. The Prescott Regional Airport is surrounded by Class D airspace and when the tower is not staffed, reverts to Class E airspace. Prescott Regional is a non-primary commercial service airport, which also includes corporate aviation, aviation business, flight training and commercial airline services. The airport has three runways, Runway 3R/21L, Runway 3L/21R, and Runway 12/30, with instrument approaches to Runways 3R/21L and Runway 12. There were 310,870 operations reported to the FAA for the 12-month period ending July 31, 2022 (SkyVector 2023).

Wickenburg Municipal Airport (E25), is located 3 miles west of Wickenburg, Arizona and approximately 8 miles from the southeastern boundary of the Gladden MOA. The airport, publicly owned by the Town of Wickenburg, is a non-towered airport with approach/departure services provided by Albuquerque ARTCC. Wickenburg Municipal Airport is within Class G, uncontrolled airspace. The airport is a general aviation airport and commercial services are not provided. The airport has one runway, Runway 5/23, with no published instrument approach procedures. There were 36,150 operations reported to the FAA for a 12-month period ending April 11, 2021 (SkyVector 2023).

3.2.3.2 ATS routes

There are no low-level ATS routes that transition the Bagdad and Gladden MOAs. V-12 runs parallel to the northern boundary of the Bagdad MOA but does not penetrate the airspace. The proposed changes to lower the altitudes in the Bagdad MOA would not impact this airway. There are two waypoints on V-12 (MEMPE and MUMTE) which are used for instrument approaches into Lake Havasu City Airport and Prescott Regional Airport, respectively; the Proposed Action does not affect these features. There are four high-altitude jet routes that transition through the ATCAAs, there are no proposed changes to the Bagdad/Gladden ATCAAs, as such, the Proposed Action does not impact these jet routes.

3.2.3.3 Civil Traffic

Approximately 6,975 civil aircraft flights annually traverse the proposed Bagdad/Gladden MOAs below 7,000 feet MSL during the proposed times of use (0600 to 0000, Monday through Friday). **Table 3.2-10** lists a sample of known civil aircraft included in the PDARs dataset for this MOA. The most common in this list are Cessna, Helicopter, Piper, Cirrus, and Beechcraft variants.

Table 3.2-10 Aircraft Types Intersecting Proposed Bagdad/Gladden MOAs under Alternative 2

Aircraft Type	Distribution
Cessna	29%
Helicopter	23%
Piper	13%
Cirrus	10%
Beechcraft	7%
RV6 (kit plane)	3%
Aviat Husky Variant	1%

For each of the flight tracks that crossed the proposed MOAs, the origin and destination airport were identified and counted providing a list of the majority of airport pairings most likely impacted. Each row in **Table 3.2-11** shows an origin airport and destination airport (the return routes would be the opposite). In each row, there is the straight-line optimum route length (rounded to nearest NM). Then listed are one or two intermediate fixes or NAVAIDs required to avoid the proposed airspace, and the distance for the route through those fixes. The difference in distance and time make up the final two columns. These most common routes vary in length from about 30 to over 150 NM. The required changes in distance would range from 0–19 NM, and the additional required time of travel ranges from less than a minute up to seven minutes.

Table 3.2-11 Potential Impacts to Civil Operations Due to Lowering Floors of Bagdad and Gladden MOAs

Origin/ Destination	GC Distance (NM)	Intermediate Fix	Distance via Intermediate Fix (NM)	Delta (NM)	Delta (minutes)
PHX-HII	135	SABLE-NIDSE	150	14	5
GYR-P20	104	NIDSE	107	3	1
FFZ-HII	147	MUMTE	166	19	7
LUF-FFZ	33	n/a		0	0
PRC-E25	45	KARLO	46	1	<1
SDL-HII	134	JAWSY	145	11	4
CHD-HII	149	ESTWD	163	14	5
GYR-HII	120	NIDSE	131	11	4
FFZ-GYR	32	n/a		0	0
SDL-P20	122	SABLE-NIDSE	129	7	2

Note: [1]In each destination airport cell, the first number is the great-circle (GC) optimum route length (rounded to nearest NM). The column "Distance Via Intermediate Fix" is the estimated re-route distance using a NAVAID or fix(es). The "delta" is the percent difference between the optimum and re-routed route lengths.

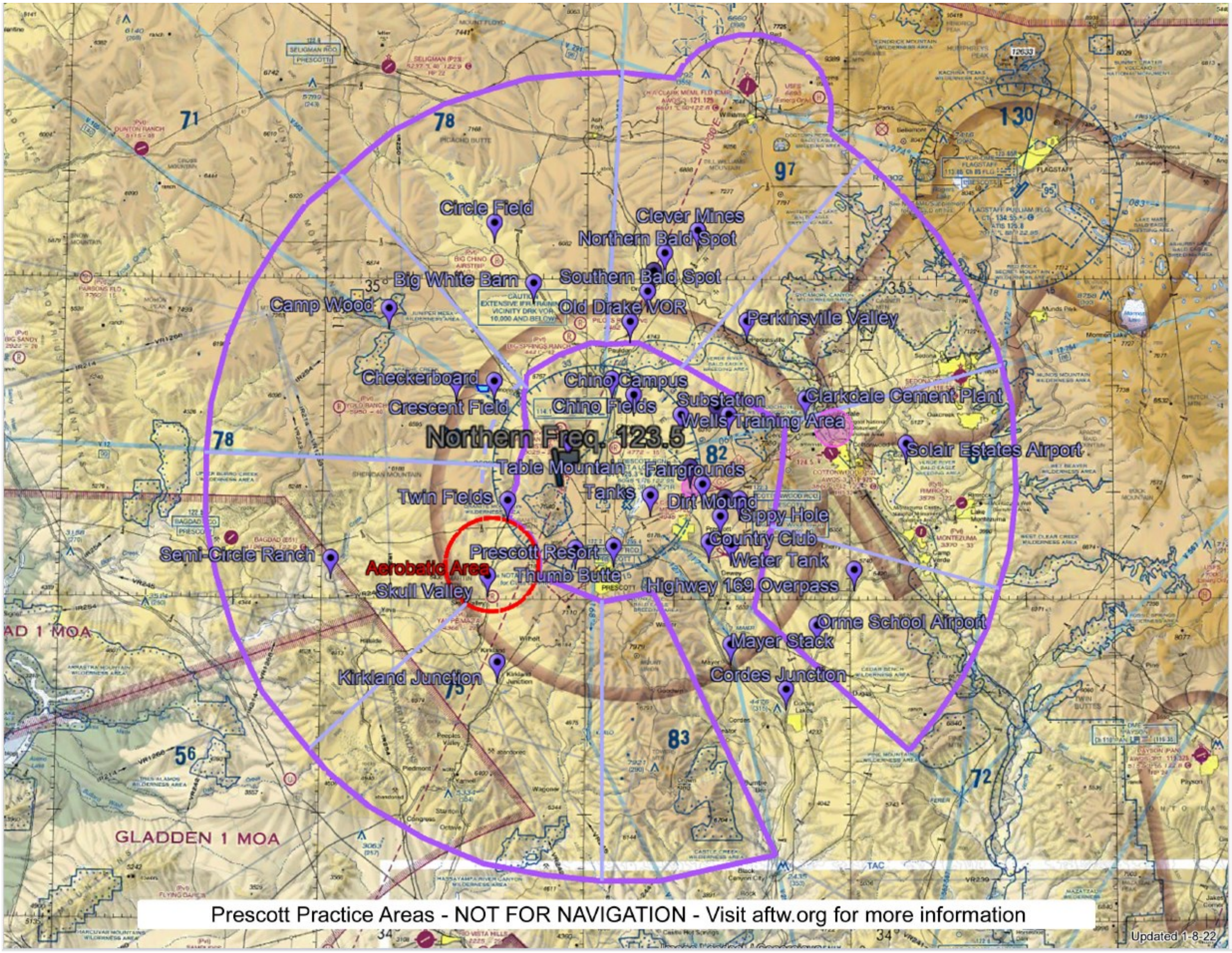
Legend: Airport and NAVAID codes: CHD = Chandler; E25 = Wickenburg; FFZ = Falcon Field; GYR = Phoenix Goodyear; HII = Lake Havasu City; LUF = Luke AFB; P20 = Avi Suquilla; PHX = Phoenix Sky Harbor; PRC = Prescott; SDL = Scottsdale.

A large number of flights transiting these MOAs were arriving or departing at three airports with known flight training schools (DVT, FFZ, and GYR). **Figure 3.2-14** depicts the training areas for Embry Riddle Aeronautical University (ERAU) out of Prescott Regional Airport. A portion of the Kirkland Junction and Semi-Circle Ranch training areas are beneath the eastern portions of the existing Bagdad and Gladden MOAs and extend from 500 feet AGL to 14,000 feet MSL, and are used 7 days a week (a figure depicting this training area was not available). **Figure 3.2-15** depicts the Lufthansa Training Area, which encompasses approximately one-third of the southwestern portion of the Gladden MOA.

3.2.4 Sells, Ruby, Fuzzy, Morenci, and Reserve MOAs/ATCAAs

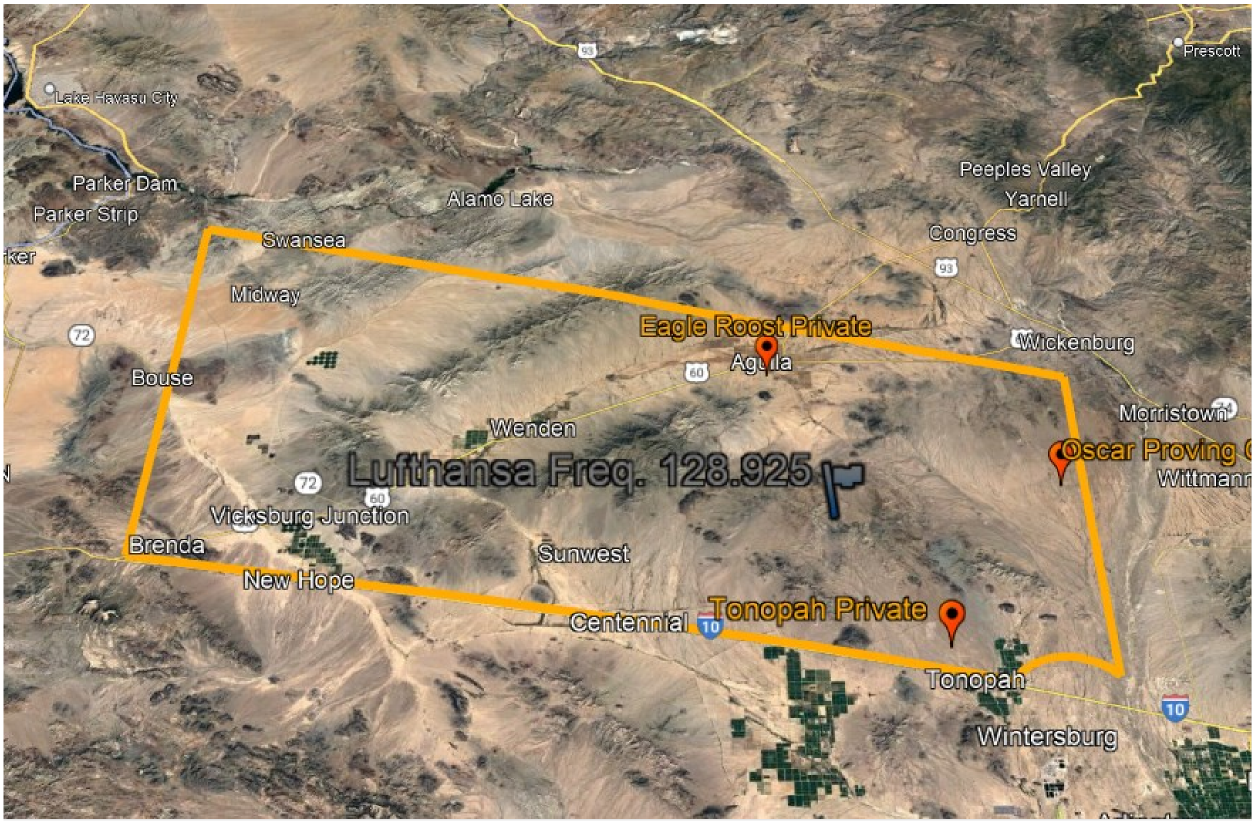
Under the Proposed Action, there would be no changes to the dimensions of the Sells, Ruby, Fuzzy, Morenci, and Reserve MOAs. The Proposed Action would be an administrative change to the published times of use in aeronautical charts and relevant flight publications for these MOAs. Published times of use do not imply military aircraft are present the entire time (see Section 1.6). Military use of MOAs is scheduled in advance for discreet blocks of time on any given day to accomplish the planned training event(s). Airspace optimization for these MOAs focuses on efficiencies gained by changing the published times of use to reflect how the airspace is currently utilized.

The MOAs are often used outside of the current published times and changes communicated through NOTAMs. The existing published times have created a heavy administrative burden when the MOAs are required outside of those times (most notably during the summer when there is limited time to accomplish required nighttime sorties). When a requirement for training outside of the published time is identified, units must initiate coordination for the use of airspace and publish the applicable NOTAMs. The daily flying schedule for operations in MOAs must be sent to the ARTCC's Military Operations Specialist the preceding day, and Fridays for weekends and holidays (355th/ZAB LOA). If a MOA end time changes, and it is after the published used time, a request for the SUA must be made at least 2 hours and 15 minutes in advance. When changes occur, it sets in motion an administrative and coordination cycle of timelines which can preclude the required pilot training.



Source: Arizona Flight Training Working Group 2022

Figure 3.2-14 Embry Riddle Aeronautical University Training Areas



Source: Arizona Flight Training Working Group 2022.

Figure 3.2-15 Lufthansa Training Area

[Note to Reviewer: attempting to find GIS data to recreate this figure]

The NOTAM publication process is lengthy and a NOTAM requires several levels of review before it can be published. Additionally, NOTAMs are temporary in nature and should not be published for conditions exceeding 90 days. When conditions warrant longer periods, a change to the appropriate flight information publication should be initiated (DAF 2019). The duration of NOTAMs for the MOAs is short; however, it has become a temporary solution to changing published MOA times. The proposed changes to the published times would better align with how the MOAs are currently used. Changing the official published times of use improves the safety of operations over temporary NOTAMs which must rely on civil users to monitor NOTAMs on a daily basis.

The Proposed Action does not change the actual times of the existing operations. As shown in **Table 3.2-12**, the percentage of sorties which would occur at night would not change with the Proposed Action. Nighttime operations already occur during the proposed times of use.

Table 3.2-12 Military Usage of Proposed MOAs under Alternative 2

MOA	Proposed Action Sorties	No Action Percent Day/Night[1]	Proposed Percent Day/Night
Sells	17,810	85 / 15	No change
Ruby/Fuzzy	7,610	90 / 10	No change
Morenci/Reserve	4,050	90 / 10	No change

Note: [1]Night sorties are those flights that occur after sunset.
Legend: MOA = Military Operations Area.

3.3 ALTERNATIVE 3

Alternative 3 is the same as Alternative 2, with some exceptions: (1) the northern expansion in the Tombstone MOA/ATCAA would not take place, (2) the floor in the Jackal MOA would be lowered to 100 feet AGL and consume the existing Jackal Low.

Impacts to Instrument Approach Procedures

Tombstone MOA/ATCAA

Under Alternative 3, the proposed northern expansion of the Tombstone MOA/ATCAA would not occur and thus the impact to the Cochise County missed approach would not occur.

Jackal/Outlaw

The proposed lower floor in the Jackal (down to 100 feet AGL) and Outlaw (down to 500 feet AGL) MOAs would impact instrument approach procedures at Phoenix-Mesa Gateway and Coolidge Municipal when the airspace is active. These impacts would be the same as Alternative 2 – Proposed Action.

Impacts to Civil Aviation

Tombstone MOA/ATCAA

The potential impacts to civil aviation associated with V-66 under Alternative 3 would be the same as described for Alternative 2 – Proposed Action. The potential impacts associated with the Low and High ATCAAs described in Alternative 2 – Proposed Action would not occur since there would not be a northern expansion.

Outlaw/Jackal MOAs

The potential impacts to civil aviation would be the same as described under Alternative 2 – Proposed Action.

Bagdad/Gladden

The potential impacts to civil aviation would be the same as described under Alternative 2 – Proposed Action.

3.4 ALTERNATIVE 4

Alternative 4 is the same as Alternative 2, except this alternative limits supersonic operations down to 10,000 feet MSL in the Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The impacts to airspace management and civil users would be the same as described for Alternative 2 – Proposed Action.

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APPENDIX I
AIRSPACE OBSTRUCTION ANALYSIS

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1 Introduction – Objects Affecting Navigable Airspace

As set forth in Title 49 of the U.S. Code of Federal Regulations (CFR), §40103, "The United States Government has exclusive sovereignty of airspace of the United States." In protecting and administering the use of U.S. airspace,

The Administrator [of the Federal Aviation Administration [FAA]] shall prescribe air traffic regulations on the flight of aircraft (including regulations on safe altitudes) for -----

(A) Navigating, protecting, and identifying aircraft;

(B) Protecting individuals and property on the ground;

(C) Using the navigable airspace efficiently; and

(D) Preventing collision between aircraft, between aircraft and land or water vehicles, and between aircraft and airborne objects.

The FAA carries out these responsibilities through a variety of means. The primary means by which the FAA analyzes proposed construction or alteration ("protecting individuals and property on the ground") that may affect navigable airspace is through the Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process.

A structure proponent must file FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, for any proposed construction or alteration that meets any of the following *Notification Criteria* described in FAR Part 77.13:

- §77.13(a)(1) – A height more than 200 feet above ground level (AGL) at its site;
- §77.13(a)(2) – Within 20,000 feet of a runway more than 3,200 feet in length, and exceeding a 100:1 slope imaginary surface (i.e., a surface rising 1 foot vertically for every 100 feet horizontally) from the nearest point of the nearest runway. (Different standards apply with proximity to airports with no runways greater than 3,200 feet in length, and heliports);
- §77.13(a)(3) – Roadways, railroads, and waterways are evaluated based on heights above surface providing for vehicles; by specified amounts or the height of the highest mobile object normally traversing the transportation corridor;
- §77.13(a)(4) – When requested by the FAA, any construction or alteration that would be in an instrument approach area and may exceed 14 CFR Part 77 obstruction standards; or,
- §77.13(a)(5) – Any construction or alteration on any public-use or military airport.

The FAA conducts an initial aeronautical study to determine whether the proposal would exceed obstruction standards under the provision of the 14 CFR FAR Part 77.17. An object constitutes an obstruction to air navigation if any of the following obstruction standards are exceeded:

- §77.17(a)(1) – A height more than 499 feet AGL at the object site.
- §77.17(a)(2) – A height AGL or above the airport elevation, whichever is greater, within 3 nautical miles of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length, and that height increases in the proportion of 100 feet for each additional nautical mile from the airport up to a maximum of 499 feet.

- §77.17(a)(3) – A height that increases a minimum instrument flight altitude within a terminal area. This standard references instrument procedure criteria such as United States Standard for Terminal Instrument Procedures (TERPS).
- §77.17(a)(4) – A height that increases a minimum obstruction clearance (MOCA) under enroute criteria.
- §77.17(a)(5) – The surface of a take-off and landing area of an airport or any imaginary surface defined in later sections: §77.19 for civil airports, §77.21 for military airports, and §77.23 for heliports.

2 Airspace Obstructions Beneath Proposed Airspace

Obstructions within each of the proposed low military operations area (MOAs) are listed in **Table 1**. The highlighted obstacles exceed the proposed floors of the Tombstone, Outlaw, and Jackal MOAs. Obstructions within the Jackal MOA would only penetrate the proposed floor under Alternative 3 (100 feet AGL); under the Proposed Action Alternative 2 there would be no obstructions above the proposed floor (500 feet AGL) (**Figure 1**). The floor in Jackal Low remains unchanged (100 feet AGL). As shown, two obstacles are 500 feet AGL or greater under Outlaw MOA (**Figure 2**). Under the proposed Tombstone MOA (100 feet AGL), several obstacles exceed 100 feet; however, all but two of the obstacles are located within the proposed exclusion area and would not penetrate the proposed floor in that area (13,000 feet mean sea level [MSL] avoidance) (**Figure 3**). There are no obstructions exceeding the proposed 500 feet AGL floor in the Bagdad or Gladden MOAs. Floor altitudes for MOAs not discussed in this section would remain unchanged.

Table 1 Obstructions 100 Feet AGL or Higher within Low MOAs

MOA Name	Obstacle ID	Height AGL (feet)	Obstacle Type	Lighting Type	Latitude	Longitude
Bagdad	04-000082	292	CATENARY	N	34.406944	-113.219167
Bagdad	04-023595	250	TOWER	D	34.480267	-113.336464
Bagdad	04-023751	270	TOWER	D	34.562728	-113.478989
Bagdad	04-000367	332	CATENARY	N	34.571389	-113.481944
Bagdad	04-066193	100	TOWER	N	34.579361	-113.162722
Bagdad	04-000165	216	CATENARY	U	34.632222	-113.522222
Bagdad	04-000164	200	CATENARY	U	34.636111	-113.524722
Bagdad	04-023631	183	TOWER	N	34.663581	-113.729983
Gladden	04-020418	257	TOWER	D	34.126944	-112.9175
Gladden	04-000552	304	TOWER	R	34.192092	-112.75475
Gladden	04-053033	120	TOWER	N	34.205875	-112.749061
Gladden	04-020052	199	TOWER	N	34.216056	-113.066194
Gladden	04-020413	170	TOWER	N	34.429167	-112.962667
Jackal	04-000134	**150**	TOWER	N	32.650278	-109.848889
Jackal	04-000044	**285**	TOWER	D	32.801353	-110.19875
Jackal	04-000040	**153**	TOWER	N	32.829444	-109.755
Jackal	04-022225	**170**	TOWER	U	32.833081	-109.653144
Jackal	04-000665	**200**	TOWER	N	32.875639	-109.839403
Jackal	04-024040	**127**	TOWER	N	32.956472	-109.695361
Jackal	04-024041	**125**	TOWER	N	32.9577	-109.65775
Jackal	04-000488	**220**	TOWER	R	33.235556	-110.185833
Jackal	04-000555	**223**	TOWER	N	33.247089	-110.193939
Jackal	04-020053	**125**	TOWER	N	33.303275	-110.468986
Jackal	04-054078	**195**	TOWER	N	33.760558	-109.974986

MOA Name	Obstacle ID	Height AGL (feet)	Obstacle Type	Lighting Type	Latitude	Longitude
Outlaw	04-054260	199	TOWER	N	32.741158	-110.650019
Outlaw	04-000485	250	TOWER	D	32.923675	-110.725381
Outlaw	04-000098	225	TOWER	D	32.972583	-110.640817
Outlaw	04-000664	202	TOWER	N	32.99225	-110.7765
Outlaw	04-000106	**1000**	STACK	R	33.005833	-110.776111
Outlaw	04-000687	205	STACK	N	33.010278	-110.778889
Outlaw	04-000028	**600**	STACK	L	33.011389	-110.78
Outlaw	04-000609	186	TOWER	D	33.029692	-110.894417
Outlaw	04-000467	262	TOWER	M	33.060897	-111.050392
Outlaw	04-000042	231	TOWER	M	33.069722	-111.054444
Outlaw	04-023633	154	TOWER	N	33.282678	-110.820931
Outlaw	04-000505	120	POLE	D	33.288611	-111.109444
Outlaw	04-000113	200	TOWER	R	33.290278	-111.341111
Outlaw	04-000339	301	STACK	U	33.294722	-111.111111
Outlaw	04-020340	199	TOWER	N	33.295392	-111.312661
Outlaw	04-020069	202	TOWER	D	33.370183	-110.588075
Outlaw	04-006022	145	TOWER	U	33.380833	-110.7575
Outlaw	04-020412	198	TOWER	N	33.400272	-110.791033
Outlaw	04-023931	155	TOWER	N	33.400472	-110.869389
Outlaw	04-059177	174	RIG	U	33.404069	-110.870661
Outlaw	04-000716	350	TOWER	R	33.408386	-110.804553
Outlaw	04-000255	144	TOWER	N	33.410586	-110.838117
Outlaw	04-054294	214	STACK	M	33.411378	-110.85675
Outlaw	04-000227	284	STACK	N	33.411758	-110.856581
Outlaw	04-059142	171	STACK	N	33.411839	-110.856278
Outlaw	04-059143	115	STACK	U	33.412067	-110.859006
Outlaw	04-054295	187	STACK	N	33.413308	-110.856219
Outlaw	04-000039	156	TOWER	U	33.413611	-110.833611
Outlaw	04-000185	187	STACK	N	33.41375	-110.858689
Outlaw	04-059139	214	STACK	M	33.414539	-110.858008
Outlaw	04-000401	127	TOWER	N	33.660278	-110.561389
Tombstone	04-081921	100	TOWER	N	31.33495	-109.552244
Tombstone	04-000158	192	TOWER	U	31.351667	-109.563889
Tombstone	04-082102	100	TOWER	N	31.363389	-109.682472
Tombstone	04-000058	212	TOWER	R	31.369167	-109.529722
Tombstone	04-020003	100	TOWER	N	31.391306	-109.928889
Tombstone	04-079300	154	TOWER	N	31.4159	-109.895097
Tombstone	04-000605	265	TOWER	D	31.444722	-109.83
Tombstone	04-000359	165	TANK	R	31.46365	-109.594753
Tombstone	04-023900	196	TOWER	N	31.481569	-109.959403
Tombstone	35-000380	**250**	STACK	N	31.758333	-108.540833
Tombstone	35-000519	**492**	TOWER	R	31.767222	-108.544722

Notes: AGL = Above Ground Level; D = Medium Density White Strobe & Red; R = Red; N = None; U = Unknown.
Source: FAA 2023.

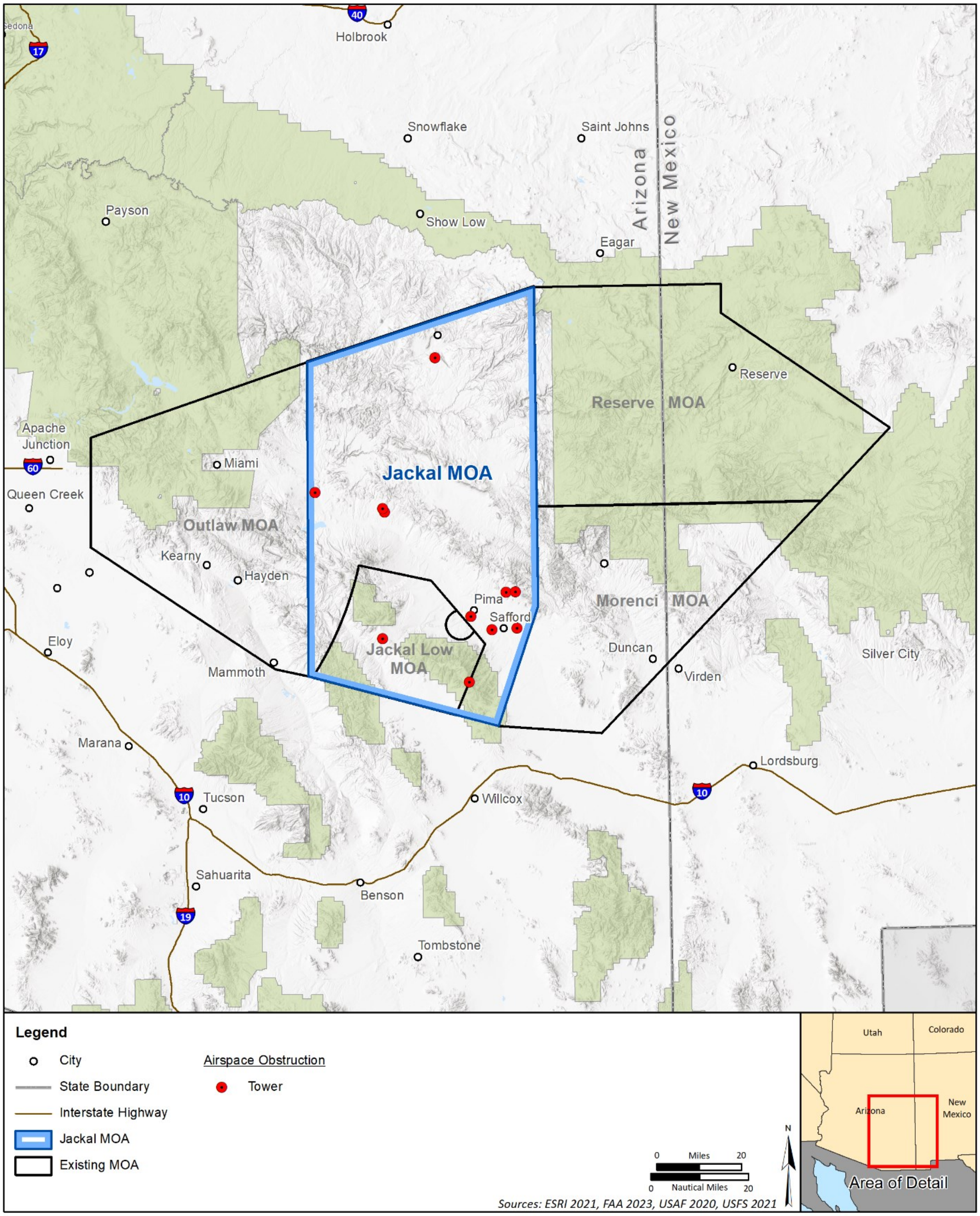

Figure 1 Obstructions in Jackal MOA (Alternative 3 only)

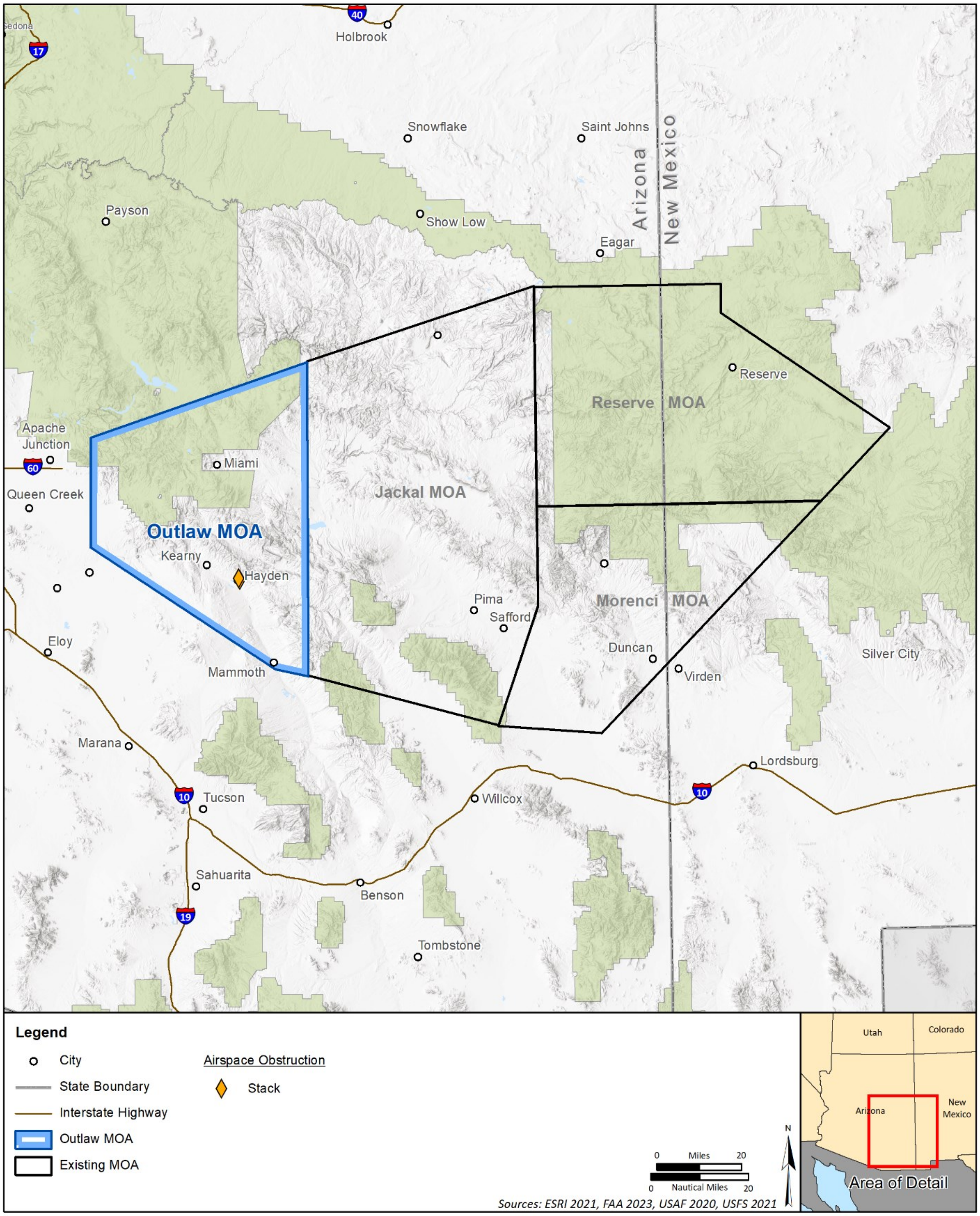

Figure 2 Obstructions in Outlaw MOA

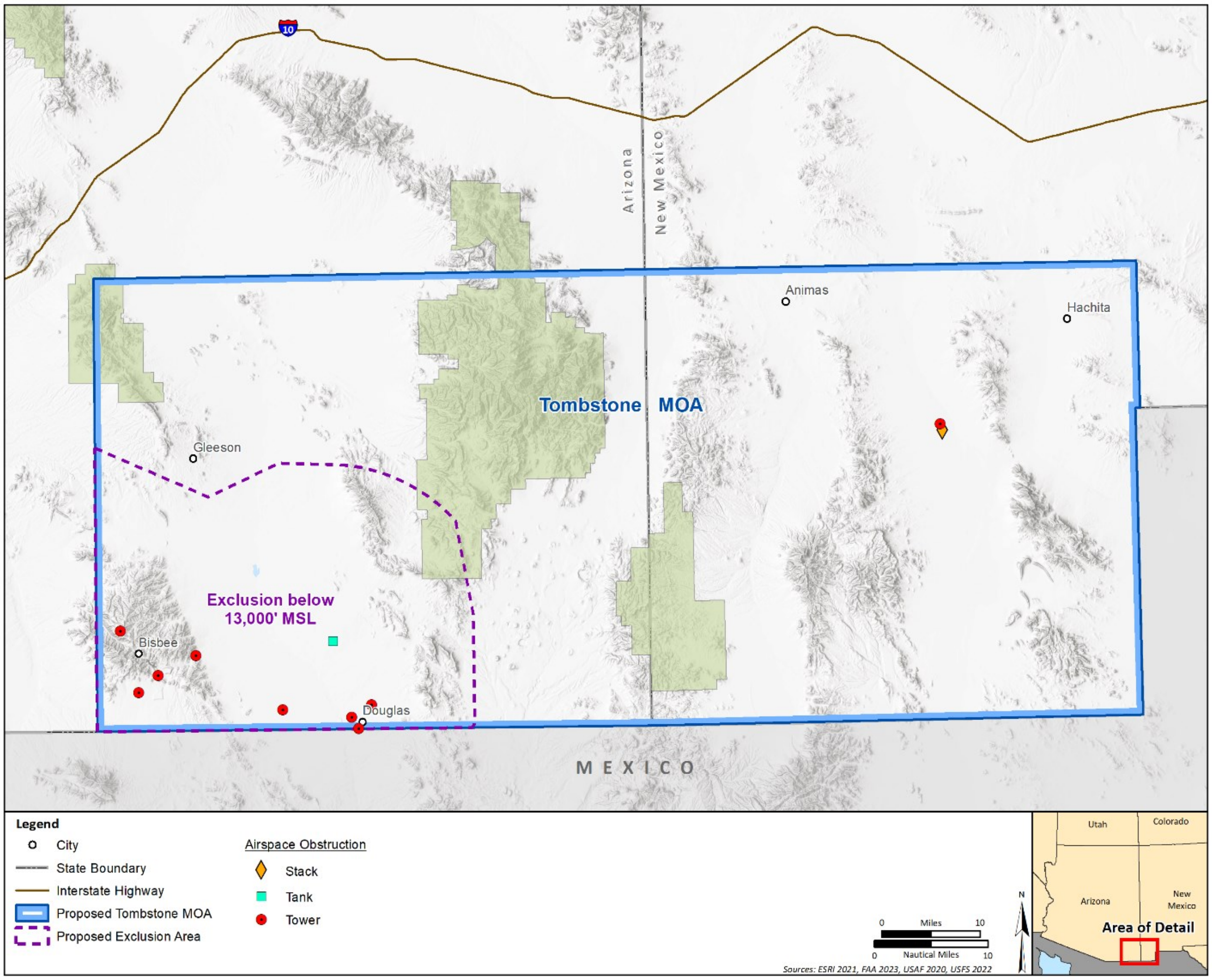

Figure 3 Obstructions in Tombstone MOA

APPENDIX J
NOISE STUDY

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NOISE STUDY FOR REGIONAL SPECIAL USE AIRSPACE OPTIMIZATION TO SUPPORT AIR FORCE MISSIONS IN ARIZONA

AUGUST 2024

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AGL	Above Ground Level
ANGB	Air National Guard Base
ANSI	American National Standards Institute
ATCAA	Air Traffic Control Assigned Airspace
CDNL	C-weighted Day-Night Average Sound Level
DAF	Department of the Air Force
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
DNL	Day-Night Average Sound Level
DNWG	Department of Defense Noise Working Group
DoD	Department of Defense
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
L_{dnmr}	Onset Rate Adjusted Day-Night Average Sound Level
L_{max}	Maximum Sound Level
MOA	Military Operations Area
MTR	Military Training Route
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
psf	pounds per square foot
SEL	Sound Exposure Level
SUA	Special Use Airspace
U.S.	United States
USEPA	U.S. Environmental Protection Agency

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1.0 INTRODUCTION

1.1 BACKGROUND

The Department of the Air Force (DAF) is proposing to alleviate training shortfalls and address evolving training needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona by requesting that the Federal Aviation Administration (FAA) implement modifications to existing DAF-managed Military Operations Areas (MOAs) and their associated Air Traffic Control Assigned Airspace (ATCAAs). The bases in Arizona share a primary mission to train and deploy combat-ready pilots for the Air Force, Air National Guard, and Air Force Reserves, thus the DAF-managed SUA in this region must support training for a variety of aircraft and missions.

This noise study supports the *Environmental Impact Statement (EIS) for Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona*. The DAF-managed SUA associated with this EIS includes 10 Military Operations Areas (MOAs) and their associated ATCAAs located throughout Arizona and a small portion of western New Mexico (**Figure 1.1-1**). The restricted areas associated with Barry M. Goldwater East (R-2301E, R-2304, and R-2305) are shown on Figure 1.1-1 for reference but no modifications are proposed to these areas, and they are not included in this noise study.

The FAA is a cooperating agency for the EIS and will adopt the EIS to comply with their National Environmental Policy Act (NEPA) procedures and issue their own Record of Decision. Thus, this noise study has been designed to meet the DAF and FAA requirements for assessing noise impacts. The National Park Service, United States (U.S.) Forest Service, and Arizona Game and Fish Department are also cooperating agencies for the EIS, but they do not have an individual NEPA requirement for the action.

1.2 SUA ASSOCIATED WITH THIS NOISE STUDY

The SUA associated with this Noise Study is described in **Table 1.2-1**. This table provides the formal SUA naming convention defined in FAA Order JO 7400.10E. To improve the readability of this document, tables, and figures a simplified naming convention is used for some MOAs as described in **Table 1.2-1**.

Table 1.2-1 SUA Associated with Noise Study

Formal Published Name	Simple Name
Tombstone A MOA	Tombstone MOA (when discussing the complex as a whole) Tombstone A, B, and C used when discussing those components specifically
Tombstone B MOA	
Tombstone C MOA	
Outlaw MOA	Outlaw MOA
Jackal MOA	Jackal MOA
Jackal Low MOA	Jackal Low MOA
Morenci MOA	Morenci MOA
Reserve MOA	Reserve MOA
Bagdad 1 MOA	Bagdad MOA
Gladden 1 MOA	Gladden MOA
Sells 1 MOA	Sells MOA
Sells Low MOA	Sells Low MOA
Ruby 1 MOA	Ruby MOA
Fuzzy MOA	Fuzzy MOA

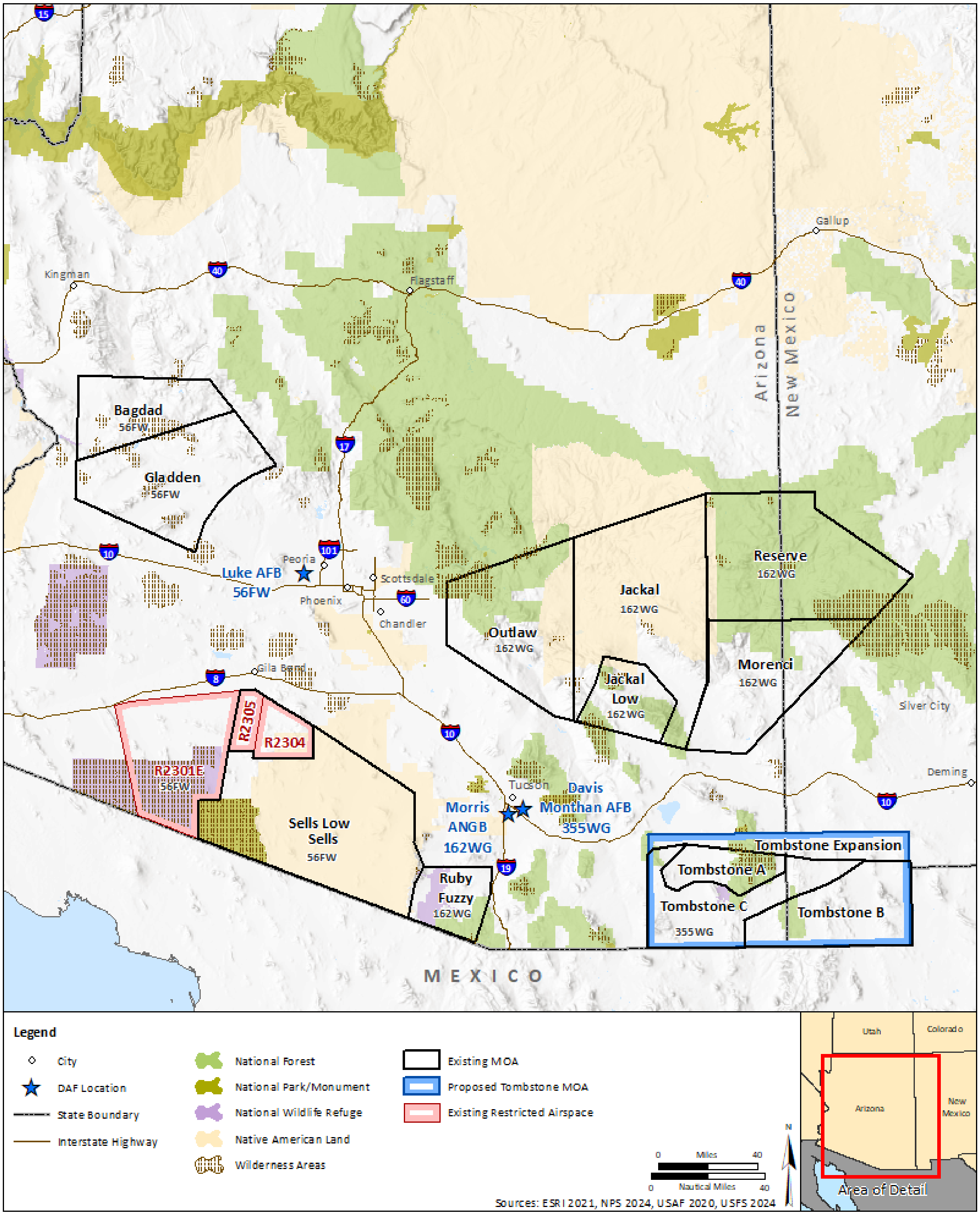

Figure 1.1-1 DAF Managed MOAs Proposed for Optimization

1.3 DOCUMENT STRUCTURE

Section 1.0 introduces this study; while Section 2.0 describes the methodology used in the analysis. Section 3.0 provides the modeling data used and the noise exposure for Alternative 1 – No Action Alternative. Section 4.0 provides the modeling data used and the noise exposure for Alternative 2 – Proposed Action and compares that exposure to the No Action Alternative. Section 5.0 provides modeling data used and noise exposure for Alternative 3 and compares that exposure to the No Action Alternative. Section 6.0 provides the modeling data used and the noise exposure for Alternative 4 and compares that exposure to the No Action Alternative. Section 7.0 summarizes the single event noise metrics used and the results calculated for this study. Section 8.0 provides a summary of the subsonic and supersonic results. Section 9.0 provides the references. Appendix A provides the noise model input data with regards to flight operations in the MOAs.

2.0 METHODOLOGY

The Department of Defense (DoD) and the Federal Interagency Committee on Noise (FICON) (1992) outline four types of metrics to describe noise exposure for environmental impact assessments:

- A measure of the greatest sound level generated by single aircraft events: Maximum Sound Level (L_{max}),
- A combination of the sound level and duration of a single aircraft event: Sound Exposure Level (SEL),
- A cumulative measure of multiple flights and engine maintenance activity (if applicable for actions in and around airfields): Day-Night Average Sound Level (L_{dn}, more commonly written as DNL), and
- A cumulative measure of noise levels in military airspace: Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}).

Human hearing sensitivity to differing sound pitch, measured in cycles per second or hertz, is not constant. To account for this effect, sound measured for environmental analysis utilizes A-weighting, which emphasizes sound roughly within the range of typical human hearing and de-emphasizes very low and very high frequency sounds that humans do not hear as well. All measurements in decibels (dB) presented in this study utilize A-weighting (dBA) but are presented as dB for brevity unless specified otherwise.

Because of the logarithmic nature of the dB unit, sound levels cannot be added or subtracted directly. The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example, 60.0 dB + 70.0 dB = 70.4 dB. The minimum change in sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness. An important facet of decibel addition arises when the concept of time-average sound levels is introduced to explain DNL. Time-average sound levels are dominated by the louder levels which occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB.

Assessing levels of noise potentially generated by proposed activities requires prediction of future conditions that cannot be measured until those activities are implemented. The solution to this predicament includes the use of computer software to simulate, or model, the future conditions, as detailed in the following sections.

2.1 Noise Modeling and Primary Noise Metrics

The DoD prescribes use of the NOISEMAP suite of computer programs (Wyle 1998; Wasmer Consulting 2006) containing the core computational programs called "NMAP," version 7.3, and "MRNMap," version 3.0 for environmental analysis of aircraft noise. For this noise study, the NOISEMAP suite of programs refers to BASEOPS as the input module and MRNMap as the noise model used to predict noise exposure in the SUA. NMPLOT is the tool used to combine the noise results produced by NOISEMAP into a combined noise exposure grid, and also assists with visualizations of combined results. As indicated in **Table 2.1-1**, the grid spacing used for calculating noise exposure for each model was 2,000 feet. While

MRNMap produces a noise exposure grid the program assumes an almost even distribution of subsonic operations throughout a MOA and there are only small differences in the noise values near the MOA boundary. Therefore, a single noise exposure value is provided for the entirety of the MOA and figures illustrating contours are not developed.

Use of the BOOMAP96 program allows computation of C-weighted Day-Night Average Sound Level (CDNL) generated by supersonic flight operations in SUA. The model used for supersonic noise concentrates supersonic operations towards the center of the airspace based on typical supersonic flight characteristics, thus, there are defined CDNL noise contours to illustrate on a figure.

Table 2.1-1 Noise Modeling Parameters

Software	Analysis	Version
MR_NMAP	Airspace Noise	3.0
BOOMAP	Sonic Boom activity in airspace (CDNL)	96
Parameter	**Description**	
Receiver Grid Spacing	2,000 feet in x and y	
Metrics	Primary: L_{dnmr}, DNL, CDNL (for sonic booms) Secondary: SEL, L_{max}	
Basis	Busy Month (MR_NMAP) Busy Month (BOOMAP)	

Legend: CDNL = C-weighted Day-Night Average Sound Level; DNL = Day-Night Average Sound Level; L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level; L_{max} = Maximum Sound Level; SEL = Sound Exposure Level.
Source: Stantec 2023.

2.1.1 Day-Night Average Sound Level (DNL) and Onset-Rate Adjusted Day-Night Average Sound Level (L_{dnmr})

DNL is an A-weighted cumulative noise metric that measures noise based on annual average daily aircraft operations. When DNL is calculated over a busy month of operations (as opposed to an average month) and when a further adjustment is made to penalize for the "surprise factor" caused by fast-moving, low altitude aircraft, the metric is called L_{dnmr}. This onset-rate adjustment penalizes the noise value by up to 11 dB, depending on the rapidity of the rise in noise. Adjustments are greater for aircraft flying at lower altitudes and higher speeds. Use of the busy month standard is useful to the DoD to characterize the impact that occurs as a result of the cyclic nature of training, where certain military training exercises may be very intense at some times, and non-existent at other times. The DoD uses L_{dnmr} as the standard metric for assessing aircraft noise in training airspace for this reason and also to account for the onset rate, especially for low-altitude tactical aircraft. The FAA standard for assessing aircraft noise is DNL. Because this noise study is in support of an EIS that will be considered both by the DAF and the FAA, both metrics were calculated and presented in this study.

DNL has two time periods of interest to model aircraft noise: daytime and nighttime. Daytime hours are from 7:00 a.m. to 10:00 p.m. local time. Nighttime hours are from 10:00 p.m. to 7:00 a.m. local time. DNL weights operations occurring during the nighttime period by adding 10 dB to their single event sound level to account for humans being typically more annoyed by noise later at night when most people are resting. Note that "nighttime" in calculation of DNL is sometimes referred to as "environmental night" or "acoustical night" and always corresponds to the times given above. This is often different than the “night” used commonly in military aviation, which is directly related to the times of sunrise and sunset and varies throughout the year with the seasonal changes in day length.

2.1.2 C-weighted Day-Night Average Sound Level (CDNL)

CDNL is similar to DNL, in that it is a cumulative metric but based on C-weighted noise, which emphasizes lower frequency sound vibrations. C-weighting better targets the lower frequencies that are “felt” in addition to or instead of “heard” and is usually impulsive noise caused by activities like explosions. CDNL values are reported as C-weighted decibels (dBC). This metric averages all of the sound energy produced during the assessment period, in this case a year, while weighting any event occurring between 10:00 p.m. to 7:00 a.m. by adding 10 dB, to account for the likelihood of higher public annoyance by nighttime noise. CDNL is used to measure the effects of sonic booms that are produced by aircraft flying at supersonic speeds.

2.2 SINGLE EVENT METRICS

The DNL metric is the primary descriptor of cumulative noise exposure and anticipated significance of impacts, but this cumulative metric does not provide information on the “loudness” of an aircraft flying in the vicinity of an observer. Thus the noise analysis includes supplemental data for single events to better describe the “loudness” of individual aircraft overflights for the aircraft proposed to operate in the MOAs at various power settings at the lowest possible altitudes (i.e., the floor of the MOA). While the cumulative metric DNL is the U.S. Government standard metric for assessing noise impacts, single event metrics can provide more information for the public and decision-makers about the most impactful events in noise sensitive locations. The Department of Defense Noise Working Group (DNWG) provides guidelines to supplement cumulative DNL (DNWG 2009). The single event noise metrics calculated for this noise study include L_{max} and SEL.

2.2.1 Maximum Sound Level (L_{max})

Individual time-varying noise events have two main characteristics: (1) a sound level, which changes throughout the event; and (2) a period of time during which the event is heard. L_{max} is the maximum sound level experienced by a receptor during a single noise event. Although the maximum sound level provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also relevant.

2.2.2 Sound Exposure Level (SEL)

The SEL takes all of the sound energy from a single event and compresses it as if the entire event occurred over 1 second. This is useful for comparing single noise events because it accounts for the maximum level of the sound in addition to the duration of the whole event. It is worth noting that SEL is always greater in value than L_{max} because it compresses all sound energy into a 1-second timeframe. For example, as a jet approaches the observer, the sound gets louder and louder, until the jet passes above the observer. At that point, the observer would experience the L_{max} (the maximum sound level), then the sound would diminish as the jet moves past the observer and off into the distance. SEL compresses the sound energy of the entire event, potentially dozens of seconds of noise that occur before and after the loudest level, into a 1-second timeframe, making the value larger than the L_{max} value.

2.2.3 Sonic Boom Overpressure

The intensity of individual sonic booms depends on several factors including aircraft size, shape, weight, altitude, and the maneuver being conducted at the time of the boom (e.g., climbing, diving, turning). The intensity of the boom is measured as an overpressure reported in pounds per square foot (psf). Overpressure is the pressure created by a shock wave over and above normal atmospheric pressure, it is not a measure of the sound produced.

2.3 AIRCRAFT PROFILE DATA

2.3.1 Based Aircraft

Profiles for the use of SUA were developed based on extensive interviews with fighter aircraft representatives from Luke AFB, Davis-Monthan AFB, and Morris ANGB. The current and anticipated use of each MOA by each aircraft is distributed into various altitude blocks to provide the most accurate model possible. The model input data are provided in **Appendix A**.

2.3.2 Transient Aircraft

Aircraft that are not based at any of the DAF installations in Arizona but use the SUA are referred to as transient aircraft. The type of aircraft varies but can include other fighter aircraft such as AV-8B, F-35, F-22, and F-18; helicopters such as MV-22 and H-60; and cargo aircraft such as C-130. The transient aircraft will account for only 4-5 percent of the total usage of the various SUA under each alternative. Because of the large number of aircraft types and the low numbers for each, all of which change from year to year, the modeling used a surrogate mix of the based aircraft types, to represent a reasonable mix of the most impactful subsonic and supersonic fighter aircraft.

2.3.3 Military Training Routes

There are a number of Military Training Routes (MTRs) throughout Arizona and New Mexico, which either pass through or beneath the MOAs considered in the EIS this noise study supports (**Figure 2.3-1**). MTRs that at least partially occur within the lateral boundaries of the MOAs are shown in **Table 2.3-1**.

Table 2.3-1 MTRs that Overlap with MOAs

IR-112	VR-239	VR-260
IR-213	VR-241	VR-263
IR-214	VR-242	VR-268
IR-250	VR-243	VR-269
IR-254	VR-244	VR-299
VR-176	VR-245	VR-1267
VR-223	VR-259	VR-1268
VR-231		

Legend: MOA = Military Operations Area; MTR = Military Training Route.

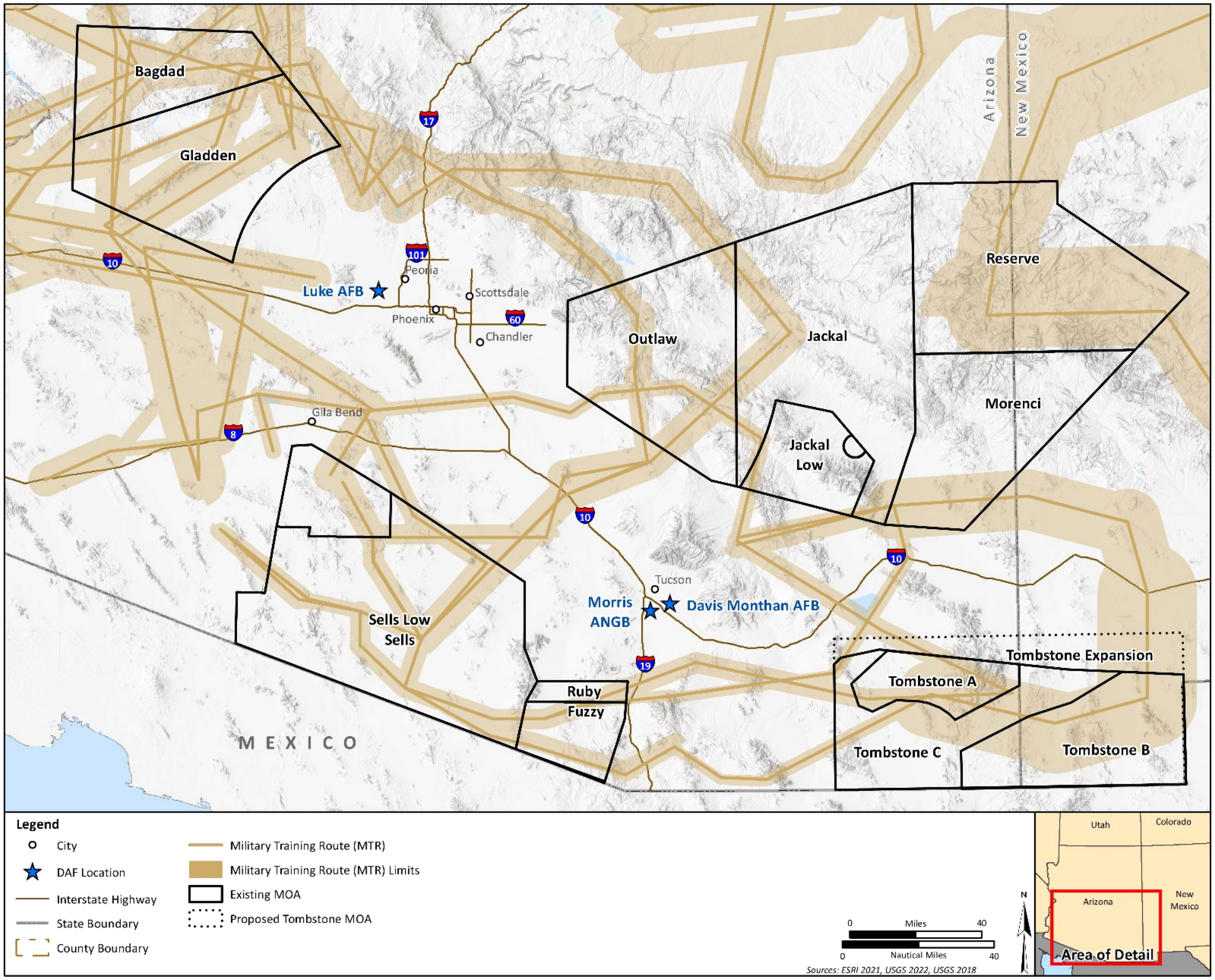

Figure 2.3-1 MTRS in the Region

The MTRs are owned by the DAF, the U.S. Navy, and the U.S. Marine Corps. Through investigation of the scheduling data for the MTRs, it was determined that the DAF-owned MTRs that overlap with the MOAs were very often scheduled concurrent with the MOA indicating these MTRs are often used to access the MOAs for ingress/egress. Thus, the noise exposure from use of the MTRs is included in existing use of the MOAs. The annual usage of these MTRs on their own (not in conjunction with an overlapping MOA) was generally very low. Because the usage numbers are low in comparison to the use of the collocated MOAs, the DNL contribution of the flight operations in the MTRs is generally negligible, and is therefore not modeled. However, MTR usage (either inside or outside the MOAs) does result in occasional instances of singular noise events that occur with a low-altitude overflight by a military aircraft. This will be discussed in Section 7.0, *Single Event Metrics*.

2.4 Impact Analysis

The impact analysis of the noise environment involves consideration of many factors including the types, locations, and frequency of aerial operations, the classification of existing airspace, and the amount of air traffic using or transiting through a given area. This study quantifies the anticipated subsonic and supersonic noise from military aircraft activity within the existing and proposed SUA using modeling software described in Section 2.1. There is no DAF defined significance threshold for noise with regard to NEPA analysis; however, the impact analysis compares the modeled results with DNL guidelines from the U.S. Environmental Protection Agency (USEPA), and Federal Interagency Committee on Urban Noise (FICUN).

The USEPA has identified 55 DNL as a level that protects public health and welfare with an adequate margin of safety (USEPA 1982). This means that 55 DNL is a threshold below which adverse noise effects are not expected to occur; this metric is provided as a frame of reference. According to the FICUN, noise exposure greater than 65 DNL is considered generally incompatible with residential, public use (i.e., schools), or recreational and entertainment areas (FICUN 1980). The U.S. Army Public Health Command indicates that 62 dBC CDNL is the level at which one could expect a rise in annoyance similar to that of a DNL level of 65 dB for subsonic noise (U.S. Army Center for Health Promotion and Preventive Medicine 2005).

The FAA has defined NEPA significance thresholds for noise impacts. For airspace actions, FAA requires that an action proponent prepare noise exposure tables to identify where noise will change by the following specified amounts in noise sensitive areas (FAA Order 1050.1F):

- For DNL 65 dB and higher: +/- DNL 1.5 dB (significant)
- For DNL 60 dB to <65 dB: +/- DNL 3 dB (reportable)
- For DNL 45 dB to <60 dB: +/- DNL 5 dB (reportable)

Per FAA Order 1050.1F, a noise sensitive area is defined as an area where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife and waterfowl refuges, and cultural and historical sites. The FAA recognizes that there are certain settings where the DNL 65 dB standard for land use compatibility may not apply.

Noise induced hearing loss risk would be a concern for populations exposed to noise greater than 80 DNL (Undersecretary of Defense for Acquisition Technology and Logistics 2009). Under the SUA addressed in this action, no person or place would be exposed to noise levels greater than 80 DNL. Thus, an assessment of noise induced hearing loss is not warranted for this action.

3.0 ALTERNATIVE 1 – NO ACTION

This section details the data inputs to the model and the resultant noise exposure in the SUA for Alternative 1 – No Action. Under the No Action Alternative, military training operations would continue as currently executed in the MOAs/ATCAAs. None of the existing MOAs/ATCAAs would be modified. The noise model for each MOA is based on the existing parameters described in **Table 3.0-1**. Refer to **Figure 1.1-1** for horizontal dimensions and general location of each MOA.

Table 3.0-1 Existing Parameters of MOAs

MOA/ATCAA	Floor (Minimum Altitude)	Supersonic Operations
Tombstone A	500 feet AGL	Above FL300
Tombstone B	500 feet AGL	
Tombstone C	14,500 feet MSL	
Outlaw	8,000 feet MSL or 3,000 feet AGL	Above FL300
Jackal	11,000 feet MSL or 3,000 feet AGL	Above FL300
Jackal Low	100 feet AGL	Not authorized
Morenci	1,500 feet AGL	Above FL300
Reserve	5,000 feet AGL	Above FL300
Bagdad	7,000 feet MSL or 5,000 feet AGL	Above 10,000 feet MSL
Gladden	7,000 feet MSL or 5,000 feet AGL	Above 10,000 feet MSL
Sells	10,000 feet MSL	Above 10,000 feet MSL
Sells Low	3,000 feet AGL	Not authorized
Ruby	10,000 feet MSL	Not authorized
Fuzzy	100 feet AGL	Not authorized

Legend: AGL = Above Ground Level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = Mean Sea Level.

3.1 SUBSONIC MODELING DATA

The aircraft training operations within each MOA analyzed for the No Action Alternative are based on current operations but have been adjusted to account for a reduction in F-16 sorties and an increase in F-35 sorties to align with the final basing of the F-35 at Luke AFB. That basing action was addressed in a previous EIS and Record of Decision (DAF 2012), but the basing was not fully complete at the time of operational data collection and preparation of this Noise Study. This future mix of F-16 and F-35 operations must be included in the No Action Alternative for this EIS since the basing decision has been made and the F-35s have started to arrive at Luke AFB.

The average annual sorties under the No Action Alternative within the MOAs are provided in **Table 3.1-1**. Some of the MOAs are almost always used together and are therefore combined in this table and other tables throughout this report. A single sortie can occur across multiple MOAs depending on the training event being accomplished and how the airspace is scheduled; therefore, the columns showing sorties by base should not be totaled since this would be an inaccurate total number of sorties for the base.

Sorties occur day and night in the MOAs as shown in **Table 3.1-2**. For operational purposes, nighttime sorties refer to those sorties that occur after sunset. For noise modeling purposes, acoustical night is defined as after 10:00 p.m. and before 7:00 a.m. Thus, the percentage of sorties that occur during "acoustical night" used in the noise model are also provided in **Table 3.1-2**.

Table 3.1-1 Annual Sorties – Alternative 1 – No Action

MOA/ATCAA	Davis-Monthan AFB	Morris ANGB	Luke AFB		Other[1]	Total Local	Transient[2]	Grand Total
	A-10	F-16	F-16	F-35				
Tombstone	2,400	850	0	0	100	3,350	100	3,450
Outlaw/Jackal	1,700	2,800	20	400	20	4,940	250	5,190
Morenci/Reserve	700	2,400	0	150	0	3,250	100	3,350
Gladden/Bagdad	20	0	1,300	5,400	0	6,720	200	6,920
Sells	250	2,400	1,200	9,800	40	13,690	1,100	14,790
Ruby/Fuzzy	1,900	2,700	20	700	20	5,340	150	5,490

Notes: [1] Other includes non-fighter aircraft stationed in Arizona (EC-130Hs, HC-130Js, HH-60Gs).
[2] Transients include DAF units stationed outside Arizona and other U.S. military. Type of aircraft varies but can include other fighter aircraft such as AV-8B, F-35, F-22, and F-18; helicopters such as MV-22 and H-60; and cargo aircraft such as C-130.

Legend: AFB = Air Force Base; ANGB = Air National Guard Base; ATCAA = Air Traffic Control Assigned Airspace; DAF = Department of the Air Force; MOA = Military Operations Area.

Table 3.1-2 Nighttime Sorties – Alternative 1 – No Action

MOA/ATCAA	Total Sorties	Nighttime Sorties[1]		Acoustical Night Sorties[2]	
		Percent	Number	Percent	Number
Tombstone	3,450	11	380	2	74
Jackal/Outlaw	5,190	11	571	1	50
Morenci/Reserve	3,350	10	335	1	27
Gladden/Bagdad	6,920	12	830	0	32
Sells	14,790	15	2,219	2	275
Ruby/Fuzzy	5,490	10	549	1	51

Notes: [1] Nighttime sorties are those flights that occur after sunset.
[2] Acoustical night is defined as 10:00pm to 7:00am.

Legend: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area.

3.2 SUBSONIC NOISE EXPOSURE

Table 3.2-1 shows the L_{dnmr} and DNL levels for Alternative 1 – No Action within the existing MOAs/ATCAAs. The noise levels computed in **Table 3.2-1** represent only the military aircraft contributions to sound levels and do not consider other sources, such as road traffic and wind. Typical ambient noise levels for quiet suburban residential areas range from 40 to 45 dB while noise in rural areas is typically 40 dB or less (American National Standards Institute [ANSI] 2013). The greatest L_{dnmr} value under the No Action is 58.6 dB in the Fuzzy MOA and the least L_{dnmr} value is in the Tombstone C MOA calculated at <35 dB.

Table 3.2-1 Noise Levels Attributable to Military Aircraft Operations – Alternative 1 – No Action

MOA/ATCAA	DNL (dB)	L_{dnmr} (dB)
Tombstone A	56.0	56.0
Tombstone B	53.3	53.3
Tombstone C	<35	<35
Jackal	37.3	37.3
Jackal Low	48.6	49.7
Outlaw	37.8	37.8
Morenci	42.4	42.4
Reserve	38.6	38.6
Gladden/Bagdad	50.5	50.5
Sells	48.5	48.5
Fuzzy	57.8	58.6
Ruby	44.7	44.7

Note: DNL is the primary metric used by FAA and L_{dnmr} is the primary metric used by DOD for noise analysis within airspace.
Legend: ATCAA = Air Traffic Control Assigned Airspace; dB = decibel; DNL = Day-Night Sound Level; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level; MOA=Military Operations Area.
Source: Stantec 2023.

MRNMap software does not calculate values below 35 dB due to difficulty of accurately predicting very low noise levels. Because of this, noise levels attributed to aircraft that range from zero to 34 dB are reported as "< 35 dB." At 35 dB noise would often be imperceptible because it would be masked by common outdoor natural sounds (such as breeze rustling foliage, birds, insects, rain), or man-made sounds (such as vehicles traveling on roads in the vicinity or distant lawnmowers). In rural areas, especially those without foliage that are far from roads, the natural quiet state can be lower than 35 dB. Such quiet could be experienced by a back-country hiker far from roads on a calm day. An aircraft noise in the range of 20 to 30 dB may be perceptible in those circumstances. Note that a small number of single events over the course of a year could all be individually noticeable or loud, but that the cumulative metric (DNL or L_{dnmr}) could still be very low (such as <35 dB).

Table 3.2-1 shows that in most of the MOAs/ATCAAs, the L_{dnmr} and DNL values are the same. The locations where they are not the same are where lower altitude flying occurs (Fuzzy and Jackal Low MOAs), because the adjustment for rise time (surprise of the observer) is more pronounced when fast aircraft are operated at lower altitudes. As shown, the existing noise environment within the MOAs is relatively low with none of the areas exceeding 65 dB DNL.

3.3 Supersonic Modeling Data

The annual supersonic sorties in the MOAs/ATCAAs are shown in **Table 3.3-1**. As detailed in **Table 3.0-1**, supersonic operations are authorized in all the MOAs/ATCAAs except for Ruby/Fuzzy. Supersonic operations are authorized at 10,000 feet Mean Sea Level (MSL) and above in Bagdad, Gladden, and Sells MOAs and in the ATCAAs only (above FL300) above the Tombstone, Jackal, Outlaw, Morenci, and Reserve MOAs.

Table 3.3-1 Supersonic Sorties – Alternative 1 – No Action

MOA/ATCAA	Total Sorties	Supersonic Sorties[1]		Authorized Altitude
		Percent	Number	
Tombstone	3,450	0	0	Above FL300
Jackal/Outlaw	5,190	12	623	Above FL300
Morenci/Reserve	3,350	11	369	Above FL300
Gladden/Bagdad	6,920	65	4,498	Above 10,000 feet MSL
Sells	14,790	60	8,874	Above 10,000 feet MSL
Ruby/Fuzzy	5,490	0	0	Not Authorized

Note: [1] Supersonic speed does not occur for the duration of the sortie, but rather during one or more 30-60 second increments.

Legend: ATCAA=Air Traffic Control Assigned Airspace; FL = Flight Level; MOA=Military Operations Area; MSL = Mean Sea Level.

3.4 SUPERSONIC NOISE EXPOSURE

The standard measure of the noise levels produced by supersonic flight is CDNL, the average of all of the sound energy produced by supersonic activity. Production of sonic booms depends on many variables, and use of the CDNL metric helps to average them all out over time. A specific, single location may or may not experience boom activity, although a location beneath or adjacent to the MOA could experience sonic booms of varying intensity. **Figures 3.4-1 through 3.4-3** show the calculated CDNL contours attributed to annual supersonic activity for each MOA/ATCAA or complex of MOAs/ATCAAs under the No Action Alternative. The center contour shows the area with the highest CDNL value along with two additional contour bands in 5-dB increments. As shown, the CDNL values for all the MOAs/ATCAAs are low. **Table 3.4-1** shows the maximum calculated supersonic noise value (CDNL) from military aircraft supersonic operations within each MOA/ATCAA or complex of MOAs/ATCAAs under the No Action Alternative. For the supersonic analysis, some MOAs/ATCAAs are grouped together (i.e., Jackal, Outlaw, Morenci, Reserve) since this is how they are used for supersonic training. Tombstone ATCAA is authorized for supersonic operations above FL300, but currently no operations include supersonic flight. Thus, the calculated CDNL is shown as “n/a” and no figure is presented.

Table 3.4-1 Supersonic Noise from Military Aircraft – Alternative 1 – No Action

MOA/ATCAA	Maximum CDNL (dBC)
Tombstone	n/a
Jackal/Outlaw/Morenci/Reserve	35
Gladden/Bagdad	50
Sells	55

Legend: ATCAA = Air Traffic Control Assigned Airspace; CDNL = C-weighted Day-Night Average Sound Level; dBC = C-weighted decibel; MOA = Military Operations Area.

Source: Stantec 2023.

In all MOAs/ATCAAs, the No Action Alternative is below the level expected to result in annoyance. The U.S. Army Public Health Command indicates that 62 CDNL is the level at which one could expect a rise in annoyance similar to that of a DNL level of 65 dB for subsonic noise (U.S. Army Center for Health Promotion and Preventive Medicine 2005).

In the Outlaw/Jackal/Morenci/Reserve MOAs/ATCAAs, the No Action Alternative results in a very small area that would be exposed to 35 dBC CDNL (**Figure 3.4-1**). Additional contours are depicting 30 and 25 dBC CDNL, very low levels not normally reported. Single sonic boom events would individually produce higher levels, but the average level represented by the CDNL metric is very low.

In the Gladden and Bagdad MOAs/ATCAAs, the highest CDNL is 50 dBC (**Figure 3.4-2**). Additional contours are shown for 45 and 40 dBC.

Figure 3.4-3 shows the CDNL contours for the No Action Alternative in the Sells MOA/ATCAA. It also shows the highest contour as CDNL 50 dBC, with additional contours illustrated for 45 and 40 dBC. The area beneath Sells MOA/ATCAA is larger than that beneath other MOAs due to the larger number of annual sorties that occur here. Note that the contours extend outside Sells MOA/ATCAA to the west. This is because the Sells MOA/ATCAA is often used in conjunction with the Restricted Area R-2301E, which is located to the west, but is not part of the proposed action.

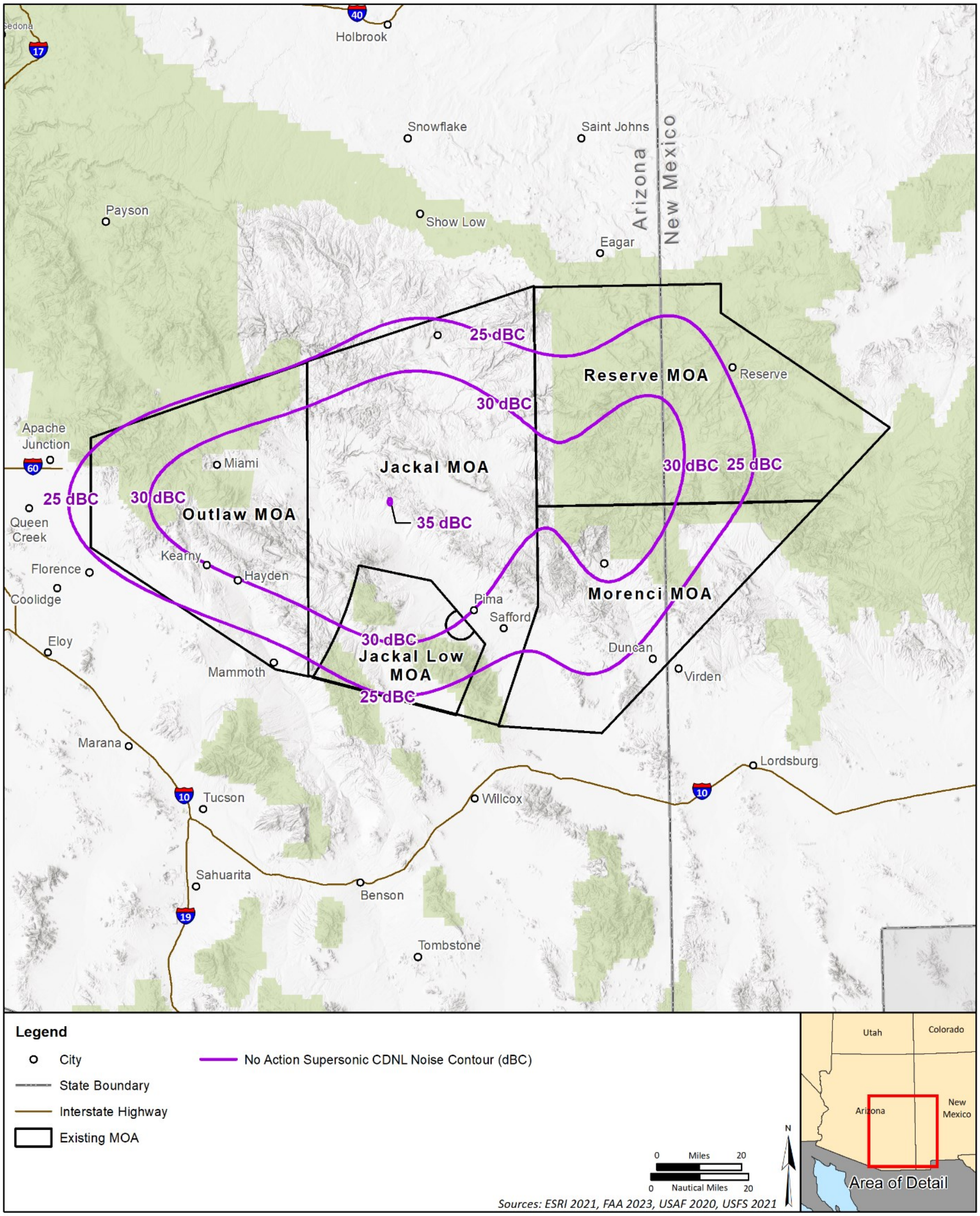

Figure 3.4-1 CDNL Contours for Outlaw/Jackal/Morenci/Reserve MOAs – No Action Alternative

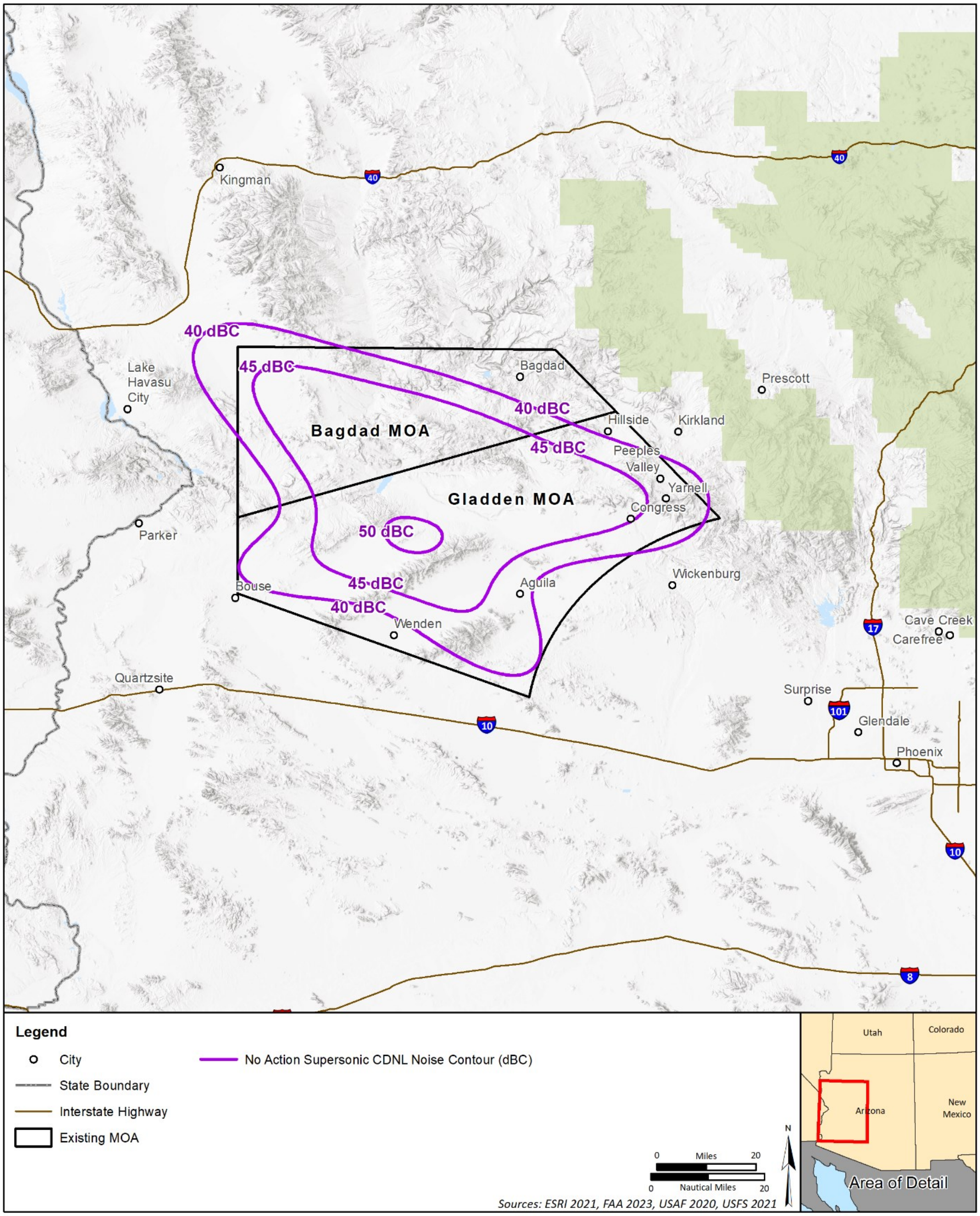

Figure 3.4-2 CDNL Contours for Bagdad/Gladden MOAs – No Action Alternative

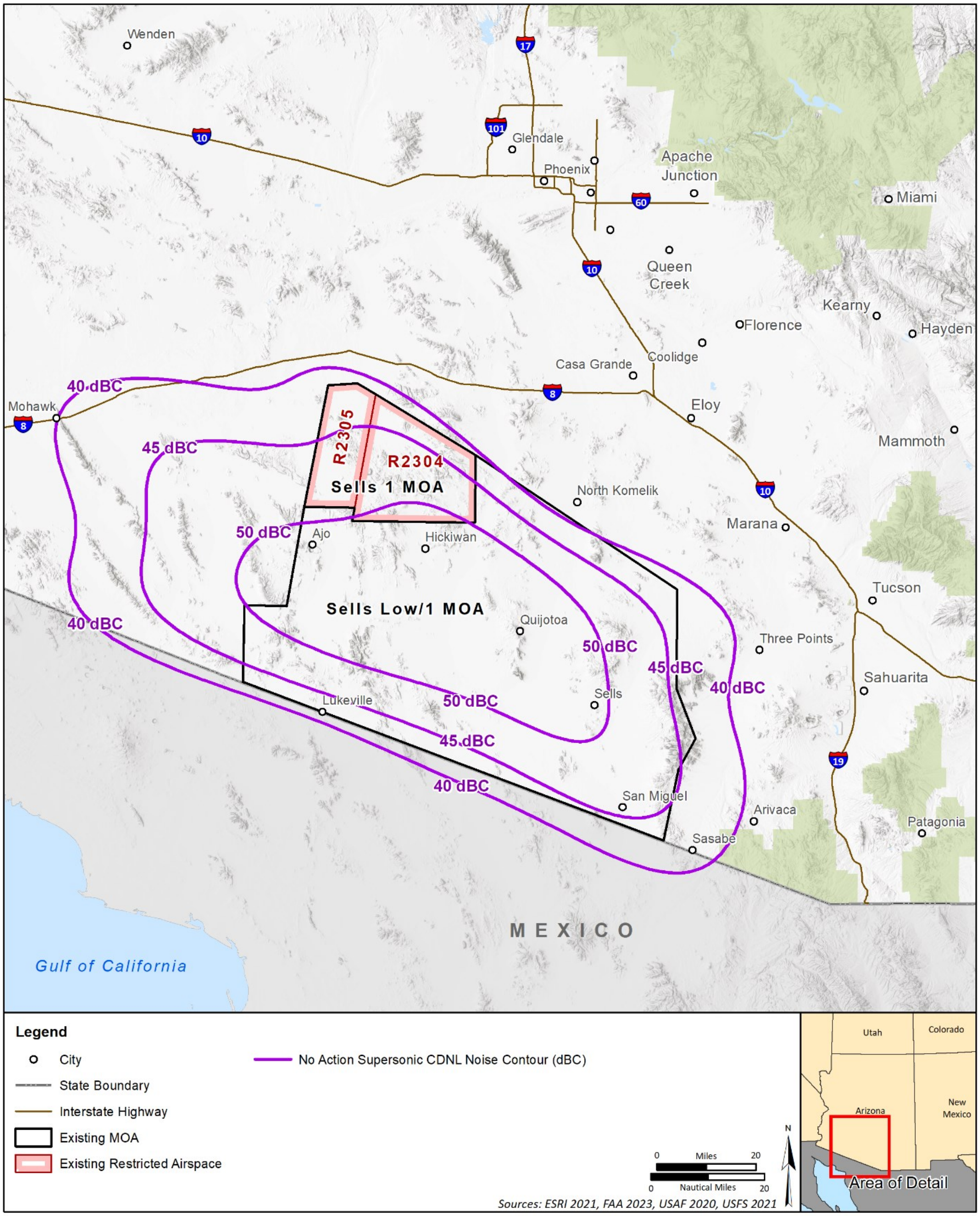

Figure 3.4-3 CDNL Contours for Sells MOA – No Action Alternative

4.0 ALTERNATIVE 2 – PROPOSED ACTION

This section details the modeling data and the expected noise exposure for Alternative 2 – Proposed Action, in which the 10 MOAs would be fully optimized. The noise model for each MOA is based on the proposed horizontal and vertical changes to the MOAs, and changes to the authorized altitude for supersonic operations (**Table 4.0-1**). For reference, the existing parameters (No Action) are also provided in this table. The proposed horizontal changes under Alternative 2 – Proposed Action are to combine the A, B, and C components of Tombstone MOA and expand the northern boundary approximately 10 nautical miles to the north (**Figure 4.0-1**). **Figure 4.0-1** also shows that the floor of this MOA would be lowered to 100 feet AGL with the exception of an exclusion area in the southwest corner of the MOA that would have a floor of 13,000 feet MSL. Proposed modifications to other MOAs/ATCAAs would be vertical changes and changes to the supersonic authorizations. Refer to **Figure 1.1-1** for the general location of all MOAs.

Table 4.0-1 Proposed Parameters of MOAs – Alternative 2 Proposed Action

MOA/ATCAA	Floor (Minimum Altitude)		Supersonic Operations	
	Alternative 1 – No Action	Alternative 2 – Proposed Action	Alternative 1 – No Action	Alternative 2 – Proposed Action
Tombstone[1]	A/B: 500 feet AGL C: 14,500 feet MSL	100 feet AGL (13,000 feet MSL exclusion area Southwest corner)	Above FL300	Above 5,000 feet AGL
Outlaw	8,000 feet MSL or 3,000 feet AGL	500 feet AGL	Above FL300	Above 5,000 feet AGL
Jackal	11,000 feet MSL or 3,000 feet AGL	500 feet AGL	Above FL300	Above 5,000 feet AGL
Jackal Low	100 feet AGL	No change	Not authorized	No change
Morenci	1,500 feet AGL	No change	Above FL300	Above 5,000 feet AGL
Reserve	5,000 feet AGL	No change	Above FL300	Above 5,000 feet AGL
Bagdad	7,000 feet MSL or 5,000 feet AGL	500 feet AGL	Above 10,000 feet MSL	No change
Gladden	7,000 feet MSL or 5,000 feet AGL	500 feet AGL	Above 10,000 feet MSL	No change
Sells	10,000 feet MSL	No change	Above 10,000 feet MSL	No change
Sells Low	3,000 feet AGL	No change	Not authorized	No change
Ruby	10,000 feet MSL	No change	Not authorized	No change
Fuzzy	100 feet AGL	No change	Not authorized	No change

Note: [1] Under Alternative 2 – Proposed Action, the horizontal dimensions of Tombstone would be expanded approximately 10 nautical miles to the north.

Legend: ATCAA = Air Traffic Control Assigned Airspace; AGL = Above Ground Level; FL = Flight Level; MOA = Military Operations Area; MSL = Mean Sea Level.

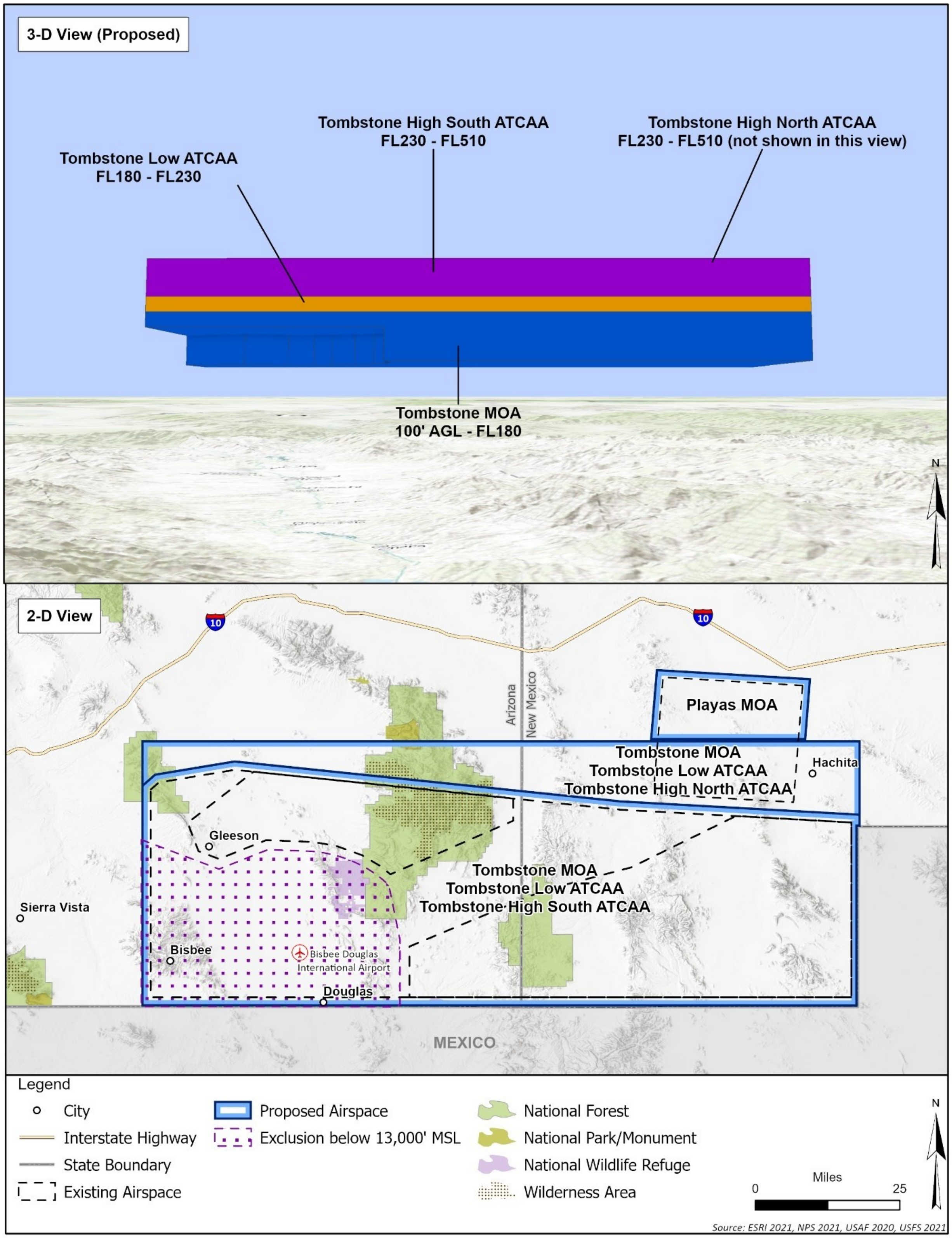

Figure 4.0-1 Tombstone MOA Horizontal Changes -Alternative 2 – Proposed Action

4.1 SUBSONIC MODELING DATA

The proposed modifications would allow for non-hazardous training (notably, low-altitude training and supersonic operations at lower altitudes) to occur in more of the MOAs. The proposed sorties for each MOA/ATCAA include sorties that currently occur there and those that could occur there with the proposed optimization, to include the anticipated additional F-35s at Luke AFB. The use of the individual MOAs/ATCAAs could fluctuate year to year. The operational data used for the noise analysis includes a 10 percent increase from the No Action operational data to conservatively account for these minor fluctuations in training (**Table 4.1-1**).

Sorties occur day and night in the MOAs/ATCAAs as shown in **Table 4.1-2**. The percentage of sorties that occur at night would not change with the Proposed Action. For operational purposes, nighttime sorties refer to those sorties that occur after sunset. For noise modeling purposes, acoustical night is defined as after 10:00 p.m. and before 7:00 a.m. Thus, the percentage of sorties that occur during "acoustical night" are also provided in **Table 4.1-2**.

4.2 SUBSONIC NOISE EXPOSURE

Table 4.2-1 shows the DNL and L_{dnmr} levels for the No Action and Alternative 2 – Proposed Action within the MOAs/ATCAAs. The noise levels computed in **Table 4.2-1** represent only the military aircraft contributions to sound levels and does not consider other sources, such as road traffic and wind. Typical ambient noise levels for 'quiet suburban residential' areas range from 40 to 45 dB while noise in rural areas is typically 40 dB or less (ANSI 2013).

As shown in **Table 4.2-1**, when compared to the No Action Alternative, Alternative 2 would result in changes to the DNL and L_{dnmr} in all of the MOAs, although the majority would have a minor change. The areas with the largest change would be Jackal, Jackal Low, Outlaw, and Gladden/Bagdad MOAs, and parts of Tombstone MOA. These are the MOAs that would have the biggest adjustment to the MOA floor, thus a higher noise exposure would be expected. The noise exposure would not exceed 65 dB DNL in any of the MOAs/ATCAAs, indicating the noise is generally compatible with all land uses. However, within some noise sensitive areas this change would be considered "reportable" according to FAA thresholds (see Section 2.4 and FAA Order 1050.1F).

Figure 4.2-1 provides an illustration of the changes reported in **Table 4.2-1** for the Tombstone MOA since this MOA consists of multiple components with varying results. There would be minor changes in noise exposure in the existing Tombstone A and B MOAs. Areas beneath Tombstone C that are outside of Tombstone A and B and the current exclusion area around the Douglas Airport (color coded light orange on Figure 4.2-1) would experience more noise exposure than they do currently. These areas currently do not experience low-level overflights, but under the Proposed Action the MOA floor would be lowered to 100 feet Above Ground Level (AGL) which would generate a noticeable difference in noise exposure. MRNMap software does not calculate values below 35 dB due to difficulty of accurately predicting very low noise levels. Because of this, noise levels attributed to aircraft that range from zero to 34 dB are reported as "< 35 dB." Therefore, a specific "change" in Tombstone C cannot be quantified since the exact value below 35 dB is not known. It can be assumed that the change would be at least 18 dB DNL or 20 dB L_{dnmr}. The noise impact in sensitive areas would be considered "reportable" by FAA regulations (see Section 2.4 and FAA Order 1050.1F).

Table 4.1-1 Proposed Annual Sorties – Alternative 2

MOA/ATCAA	No Action	Proposed								Change from No Action
		Davis-Monthan AFB	Morris ANGB	Luke AFB		Other[1]	Total Local	Transient[2]	Grand Total	
		A-10	F-16	F-16	F-35					
Tombstone	3,450	6,600	1,100	0	0	150	7,850	150	8,000	+4,550
Outlaw/Jackal	5,190	2,100	3,400	20	750	40	6,310	300	6,610	+1,420
Morenci/Reserve	3,350	850	2,900	0	150	0	3,900	150	4,050	+700
Gladden/Bagdad	6,920	20	0	1,600	7,300	0	8,920	200	9,120	+2,200
Sells	14,790	350	3,100	1,400	11,600	60	16,510	1,300	17,810	+3,020
Ruby/Fuzzy	5,490	2,300	4,200	20	850	40	7,410	200	7,610	+2,120

Notes: [1] Other includes non-fighter aircraft stationed in Arizona (EC-130Hs, HC-130Js, HH-60Gs).
[2] Transients include DAF units stationed outside Arizona and other U.S. military. Type of aircraft varies but can include other fighter aircraft such as AV-8B, F-35, F-22, and F-18; helicopters such as MV-22 and H-60; and cargo aircraft such as C-130.

Legend: AFB = Air Force Base; ANGB = Air National Guard Base; ATCAA = Air Traffic Control Assigned Airspace; DAF = Department of the Air Force; MOA = Military Operations Area.

Table 4.1-2 Proposed Nighttime Sorties – Alternative 2

MOA/ATCAA	Total Sorties	Nighttime Sorties[1]		Acoustical Night Sorties[2]	
		Percent	Number	Percent	Number
Tombstone	8,000	11	880	2	171
Outlaw/Jackal	6,610	11	727	1	63
Morenci/Reserve	4,050	10	405	1	32
Gladden/Bagdad	9,120	12	1094	0	42
Sells	17,810	15	2672	2	331
Ruby/Fuzzy	7,610	10	761	1	71

Note: [1] Night sorties are those flights that occur after sunset.
[2] Acoustical night is defined as 10:00pm to 7:00am. Percentages in this table have been rounded up to the nearest whole number.

Legend: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area.

Table 4.2-1 Noise Levels Attributable to Military Aircraft Operations – Alternative 2

MOA/ATCAA	Alternative 1 – No Action		Alternative 2 – Proposed Action		Change		FAA Determination of Impact in Noise Sensitive Areas
	DNL (dB)	L_{dnmr} (dB)	DNL (dB)	L_{dnmr} (dB)	DNL (dB)	L_{dnmr} (dB)	
Tombstone A	56.0	56.0	53.6	55.1	-2.4	-0.9	Not significant
Tombstone B	53.3	53.3	53.6	55.1	0.3	1.8	Not significant
Tombstone C [1]	<35	<35	53.6	55.1	18 (approximate)	20 (approximate)	Reportable
Tombstone (Proposed Expansion) [2]	--	--	53.6	55.1	--	--	Reportable
Tombstone (Exclusion Area)	<35	<35	<35	<35	0	0	Not significant
Jackal	37.3	37.3	47.3	47.7	10	10	Reportable
Jackal Low	48.6	49.7	55.8	59.1	7	9	Reportable
Outlaw	37.8	37.8	42.5	42.5	5	5	Not Significant
Morenci	42.4	42.4	43.1	43.1	1	1	Not significant
Reserve	38.6	38.6	39.2	39.2	1	1	Not significant
Gladden/Bagdad	50.5	50.5	57.6	58.0	7	8	Reportable
Sells	48.5	48.5	49.3	49.3	1	1	Not significant
Fuzzy	57.8	58.6	59.6	60.5	2	2	Not significant
Ruby	44.7	44.7	46.4	46.4	2	2	Not significant

Notes: DNL is the primary metric used by FAA, and L_{dnmr} is the primary metric used by DOD for noise analysis within airspace.

[1]MRNMap software does not calculate values below 35 dB due to difficulty of accurately predicting very low noise levels. Because of this, noise levels attributed to aircraft that range from zero to 34 dB are reported as "< 35 dB". Thus a "change" cannot be quantified since the exact DNL is unknown. In this table, the change shown is the difference from 35 dB and is an approximate value.

[2]MRNMap calculates DNL/L_{dnmr} for military aircraft activity. There is currently no military aircraft activity in the proposed expansion area of Tombstone, thus there is no modeled DNL or L_{dnmr} to calculate a "change".

Legend: ATCAA = Air Traffic Control Assigned Airspace; dB = decibel; DNL = Day-Night Sound Level; FAA = Federal Aviation Administration; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level; MOA=Military Operations Area.

Source: Stantec 2023.

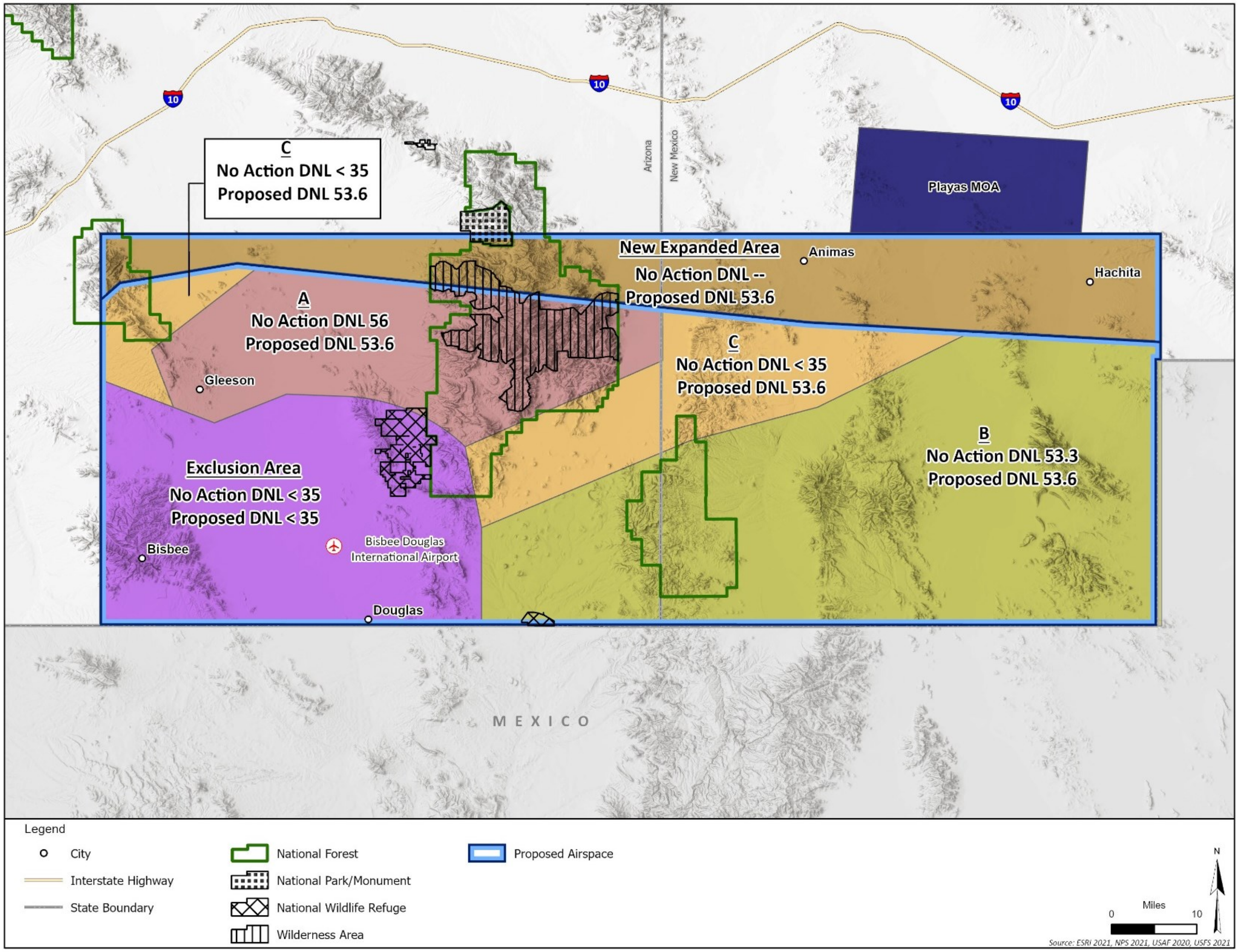

Figure 4.2-1 Subsonic Noise Exposure in Tombstone MOA- Alternative 2

In the proposed expansion area, a No Action DNL is not calculated since there currently aren't military aircraft operating in this area, the model only accounts for military aircraft activity. Therefore, a specific "change" in this area cannot be quantified. It is assumed the current noise environment is relatively low and general noise sources would be from commercial or civil aircraft, road traffic, and other non-human sources such as wind and thunder. It is assumed this area would have similar increases in noise exposure as Tombstone C MOA. The change in this area would also be considered a "reportable" noise impact in noise sensitive areas according to FAA regulations (see Section 2.4 and FAA Order 1050.1F).

4.3 Supersonic Modeling Data

Under Alternative 2 – Proposed Action, supersonic training would occur at lower altitudes. **Table 4.3-1** shows the numbers of training sorties that would include supersonic flight and the authorized altitude for each MOA/ATCAA. The authorized altitude in Gladden/Bagdad, Sells, and Ruby/Fuzzy would not be changed with the Proposed Action.

Table 4.3-1 Supersonic Sorties – Alternative 2 Proposed Action

MOA/ATCAA	Total Sorties	Supersonic Sorties[1]		Authorized Altitude
		Percent	Number	
Tombstone	8,000	1	80	Above 5,000 feet AGL
Jackal/Outlaw	6,610	14	925	Above 5,000 feet AGL
Morenci/Reserve	4,050	11	446	Above 5,000 feet AGL
Gladden/Bagdad	9,120	66	6,019	Above 10,000 feet MSL (existing authorization)
Sells	17,810	60	10,686	Above 10,000 feet MSL (existing authorization)
Ruby/Fuzzy	7,610	0	0	Not Authorized

Notes: [1]Supersonic speed does not occur for the duration of the sortie, but rather during one or more 30-60 second increments.
Legend: AGL = Above Ground Level; ATCAA=Air Traffic Control Assigned Airspace; MOA=Military Operations Area; MSL = Mean Sea Level.

4.4 Supersonic Noise Exposure

The standard measure of the noise levels produced by supersonic flight is CDNL, the average of all the sound energy produced by supersonic activity. Production of sonic booms depends on many variables, and use of the CDNL metric helps to average them all out over time. A specific, single location may or may not experience boom activity, although a location inside the depicted CDNL contours would experience some sonic booms. Authorizing supersonic flight at lower altitudes could make sonic boom events more noticeable in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs/ATCAAs. **Figures 4.4-1 through 4.4-3** shows the predicted CDNL contours attributed to annual supersonic activity for Alternative 2 – Proposed Action. The center contour shows the area with the highest CDNL value along with two additional contour bands in 5-dB increments. **Table 4.4-1** shows the maximum calculated supersonic noise value (CDNL) from military aircraft supersonic operations within each MOA/ATCAA under Alternative 2 – Proposed Action and compares this value to No Action. As shown, the CDNL values for all the MOAs are very low. A figure for Tombstone MOA was not created since the maximum CDNL is less than 35 dB, which is considered to be low enough that cumulative metrics are difficult to accurately project. The low CDNL value is due to the very low proposed number of sorties that might involve supersonic flight, averaging less than two per week. This means that there would be some single event sonic boom events that would be noticeable at various locations near the MOA, but that the cumulative effect would be very low. For the supersonic analysis, some MOAs are grouped together (i.e., Jackal, Outlaw, Morenci, Reserve MOAs) since this is how they are often used for supersonic training.

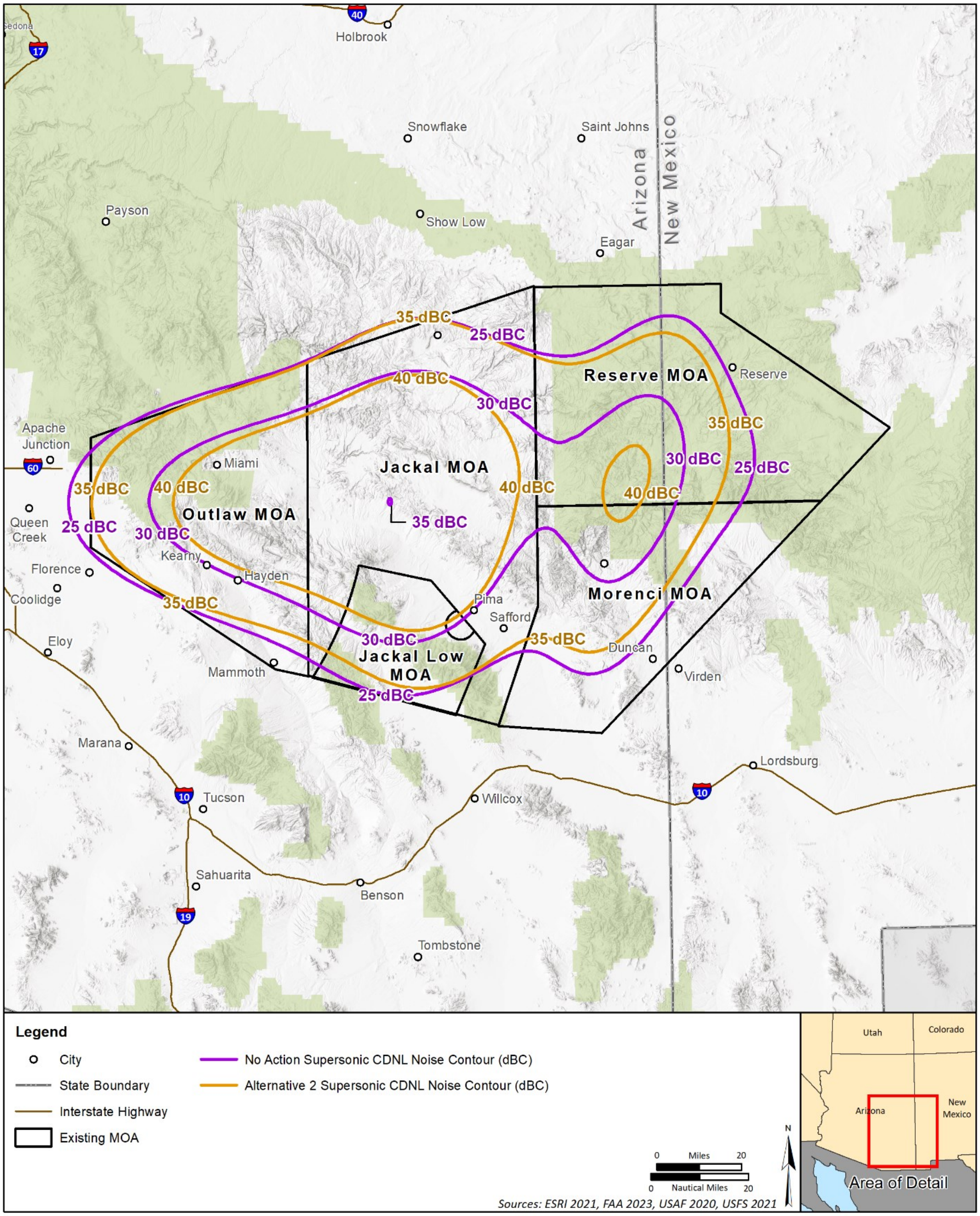

Figure 4.4-1 CDNL Contours for Jackal/Outlaw/Morenci/Reserve MOAs – Alternative 2

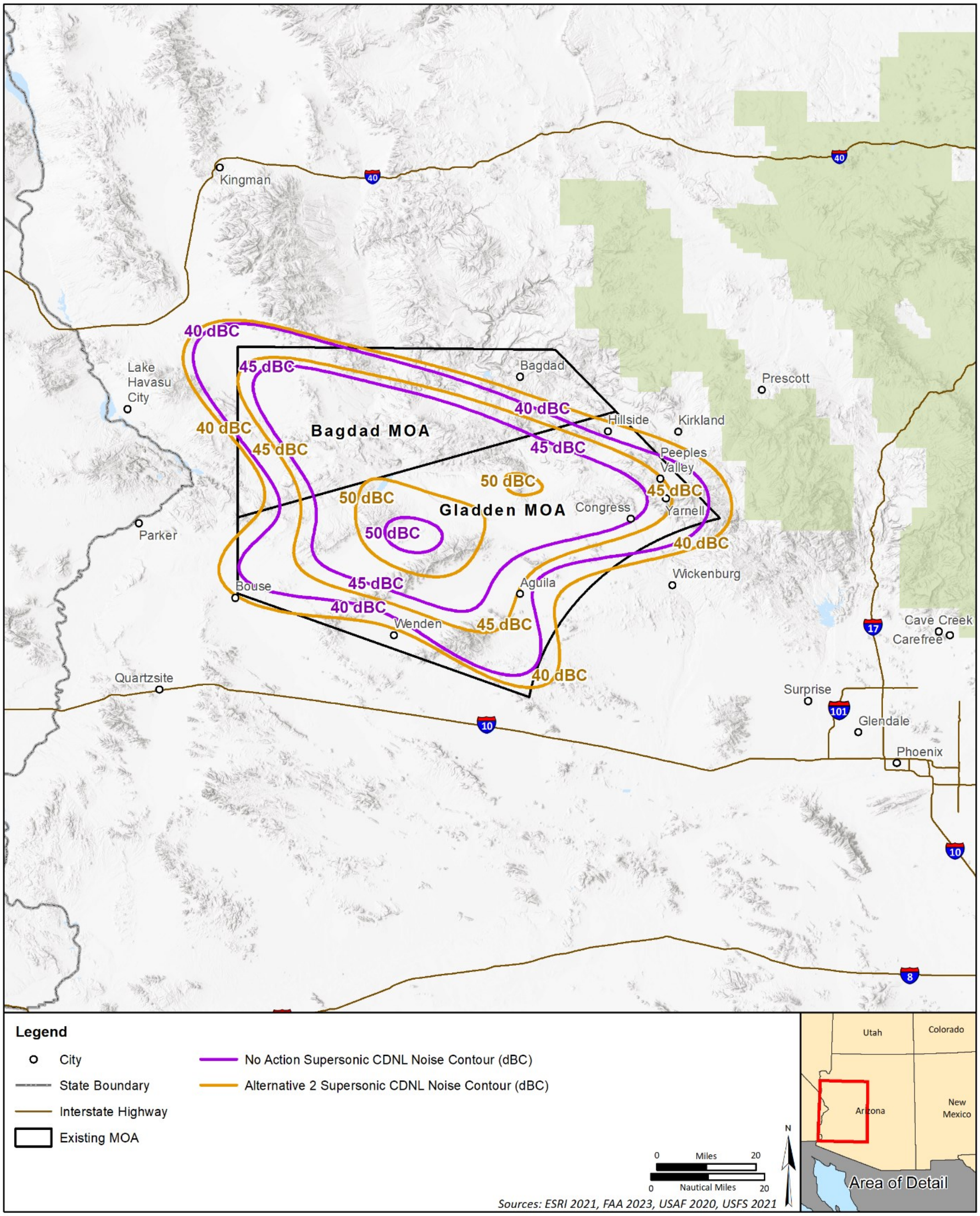

Figure 4.4-2 CDNL Contours for Bagdad/Gladden MOAs – Alternative 2

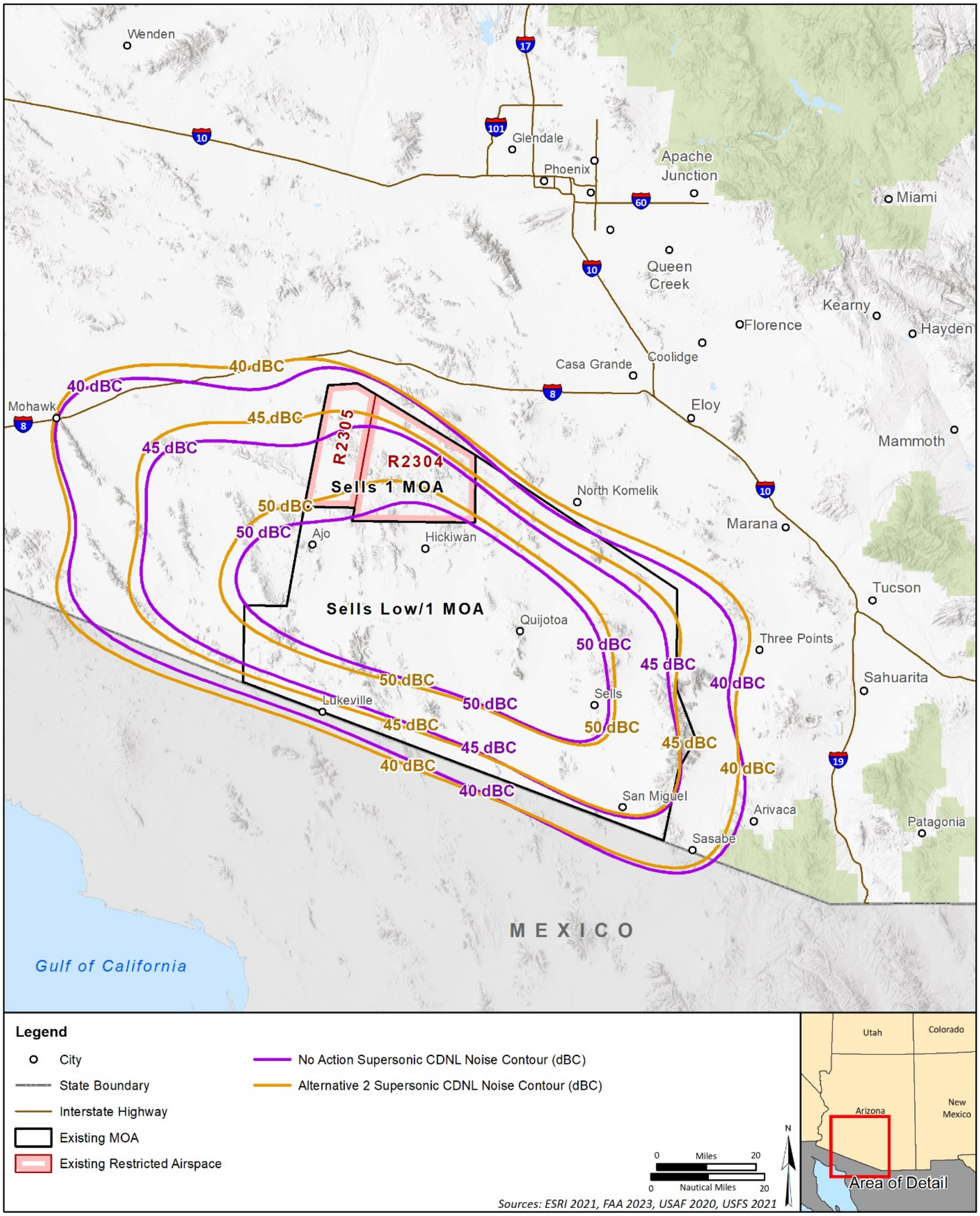

Figure 4.4-3 CDNL Contours for Sells MOA – Alternative 2

Table 4.4-1 Supersonic Noise from Military Aircraft – Alternative 2

MOA/ATCAA	Alternative 1 – No Action Maximum CDNL (dBC)	Alternative 2 – Proposed Action Maximum CDNL (dBC)	Change (dBC)
Tombstone[1]	n/a	<35	n/a
Jackal/Outlaw/Morenci/Reserve	35	44	9
Gladden/Bagdad	50	52	2
Sells[2]	55	55	<1

Note: [1]Tombstone is authorized for supersonic operations under the No Action but currently no supersonic operations occur. The CDNL under Alternative 2 is too low to accurately model, thus a specific change is not calculable.
[2]The CDNL values for Alternative 1 and Alternative 2 in Sells MOA both round to 55, although there is a small difference of less than 1 dBC.

Legend: ATCAA = Air Traffic Control Assigned Airspace; CDNL = C-weighted Day-Night Average Sound Level; dBC = C-weighted decibel; MOA = Military Operations Area.

Source: Stantec 2023.

Under Alternative 2, the Outlaw, Jackal, Morenci, and Reserve MOAs would be expected to see about a 9 dBC change in maximum CDNL when compared to the No Action Alternative. This is due to several factors, including the lowering of the minimum altitude for supersonic flight and the increase in usage of these MOAs. Larger numbers of aircraft and flying lower altitudes would increase the number and intensity of sonic booms. This increase results in CDNL of 44 dBC at the most (see **Figure 4.4-1**), which is low and well below the level expected to cause annoyance.

Gladden and Bagdad MOAs (see **Figure 4.4-2**) would experience an increase of about 2 dBC CDNL under Alternative 2, bringing the maximum up to 52 dBC CDNL. This is also 10 dBC below levels expected to result in annoyance. The U.S. Army Public Health Command indicates that 62 CDNL is the level at which one could expect for a rise in annoyance similar to that of a DNL level of 65 dB for subsonic noise. (U.S. Army Center for Health Promotion and Preventive Medicine 2005). The increase is attributable to an increase in sorties as the authorized altitude of supersonic flight would not change in these MOAs.

Sells MOA would have a small change in CDNL under Alternative (see **Figure 4.4-3)**. In this case, the increase is not due to the attributes of the airspace changing, but due to the small increase in total sorties used in the noise analysis.

5.0 ALTERNATIVE 3

This section details the modeling data and the expected noise exposure for Alternative 3. This alternative would include the same vertical changes to the MOAs as described for Alternative 2 except for Jackal MOA which would be lowered to 100 feet AGL. The changes to the authorized altitude for supersonic operations would be the same as described in Alternative 2 – Proposed Action. This alternative would not include the northern expansion of the Tombstone MOA as described in Alternative 2. The noise model for each MOA/ATCAA is based on the proposed parameters detailed in **Table 5.0-1**. For reference, the existing parameters (No Action) are also provided in this table. Refer to **Figure 1.1-1** for horizontal dimensions and general location of each MOA.

Table 5.0-1 Proposed Parameters of MOAs – Alternative 3

	Floor (Minimum Altitude)		Supersonic Operations	
MOA/ATCAA	**Alternative 1 – No Action**	**Alternative 3**	**Alternative 1 – No Action**	**Alternative 3**
Tombstone	A/B: 500 feet AGL C: 14,500 feet MSL	100 feet AGL (13,000 feet MSL exclusion area Southwest corner)	Above FL300	Above 5,000 feet AGL
Outlaw	8,000 feet MSL or 3,000 feet AGL	500 feet AGL	Above FL300	Above 5,000 feet AGL
Jackal	11,000 feet MSL or 3,000 feet AGL	100 feet AGL	Above FL300	Above 5,000 feet AGL
Jackal Low	100 feet AGL	Removed	Not authorized	No change
Morenci	1,500 feet AGL	No change	Above FL300	Above 5,000 feet AGL
Reserve	5,000 feet AGL	No change	Above FL300	Above 5,000 feet AGL
Bagdad	7,000 feet MSL or 5,000 feet AGL	500 feet AGL	Above 10,000 feet MSL	No change
Gladden	7,000 feet MSL or 5,000 feet AGL	500 feet AGL	Above 10,000 feet MSL	No change
Sells	10,000 feet MSL	No change	Above 10,000 feet MSL	No change
Sells Low	3,000 feet AGL	No change	Not authorized	No change
Ruby	10,000 feet MSL	No change	Not authorized	No change
Fuzzy	100 feet AGL	No change	Not authorized	No change

Legend: AGL = Above Ground Level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = Mean Sea Level.

5.1 SUBSONIC MODELING DATA

Similar to Alternative 2 – Proposed Action, the proposed modifications under Alternative 3 would allow for non-hazardous training (notably, low-altitude training and supersonic operations at lower altitudes) to occur in more of the MOAs. The proposed sorties for each MOA include sorties that currently occur there and those that could occur there with the proposed optimization, to include the anticipated additional F-35s at Luke AFB. The use of the individual MOAs could fluctuate year to year. The operational data used for the noise analysis includes a 10 percent increase from the No Action operational data to conservatively account for these minor fluctuations in training (**Table 5.1-1**). It should be noted that the proposed sorties under Alternative 3 within the Morenci/Reserve, Bagdad/Gladden, Sells, and Ruby/Fuzzy MOAs are the same as Alternative 2 – Proposed Action (these MOAs are highlighted gray in the following tables for reference). The proposed sorties within Tombstone and Outlaw/Jackal would be different than Alternative 2 – Proposed Action.

Sorties occur day and night in the MOAs as shown in **Table 5.1-2**. The percentage of sorties that occur at night would not change under Alternative 3. For operational purposes, nighttime sorties refer to those sorties that occur after sunset. For noise modeling purposes, acoustical night is defined as after 10:00 p.m. and before 7:00 a.m. The percentages of sorties that could occur during "acoustical night" are also provided in **Table 5.1-2**.

5.2 SUBSONIC NOISE EXPOSURE

Table 5.2-1 shows the L_{dnmr} and DNL levels for the No Action and Alternative 3 within the MOAs/ATCAAs. The noise levels computed in **Table 5.2-1** represent only the military aircraft contributions to sound levels and does not consider other sources, such as road traffic and wind. Typical ambient noise levels for 'quiet suburban residential' areas range from 40 to 45 dB while noise in rural areas is typically 40 dB or less (ANSI 2013).

For subsonic noise, Alternative 3 is the same as Alternative 2 for all of the MOAs except for the Jackal, Jackal Low, and Tombstone MOAs. Alternative 3 adds a further lowering of the floor of the Jackal MOA to 100 feet AGL, which would accommodate some of the demand for lower airspace. Lower activity across the Jackal MOA is the primary reason for the increase in noise in this location. Note that the Jackal Low MOA would be absorbed by the lowered floor of the Jackal MOA. Compared to the No Action, Alternative 3 shows a large increase in subsonic noise in the Jackal MOA.

Figure 5.2-1 provides an illustration of the changes reported in **Table 5.2-1** for the Tombstone MOA since this MOA consists of multiple components with varying results. There would be minor changes in noise exposure in the existing Tombstone A and B MOAs. Areas beneath Tombstone C that are outside of Tombstone A and B and the current exclusion area around the Douglas Airport (color coded light orange on **Figure 5.2-1**) would experience more noise exposure than they do currently. These areas currently do not experience low-level overflights, but under the Proposed Action, the MOA floor would be lowered to 100 feet AGL which would generate a noticeable difference in noise exposure. MRNMap software does not calculate values below 35 dB due to difficulty of accurately predicting very low noise levels. Because of this, noise levels attributed to aircraft that range from zero to 34 dB are reported as "< 35 dB." Therefore, a specific "change" in Tombstone C cannot be quantified since the exact value below 35 dB is not known. It can be assumed that the change would be at least 20 dB DNL or 21 dB L_{dnmr}. The noise impact in sensitive areas would be considered "reportable" by FAA regulations (see Section 2.4 and FAA Order 1050.1F).

Table 5.1-1 Proposed Annual Sorties – Alternative 3

MOA/ATCAA	No Action	Proposed								Change from No Action
		Davis-Monthan AFB	Morris ANGB	Luke AFB		Other[1]	Total Local	Transient[2]	Grand Total	
		A-10	F-16	F-16	F-35					
Tombstone	3,450	5,500	1,100	0	0	150	6,750	150	6,900	+ 3,450
Outlaw/Jackal	5,190	3,200	3,400	20	750	40	7,410	300	7,710	+2,520
Morenci/Reserve	3,350	850	2,900	0	150	0	3,900	150	4,050	+700
Gladden/Bagdad	6,920	20	0	1,600	7,300	0	8,920	200	9,120	+2,200
Sells	14,790	350	3,100	1,400	11,600	60	16,510	1,300	17,810	+3,020
Ruby/Fuzzy	5,490	2,300	4,200	20	850	40	7,410	200	7,610	+2,120

Notes: [1]Other includes non-fighter aircraft stationed in Arizona (EC-130Hs, HC-130Js, HH-60Gs).
[2]Transients include DAF units stationed outside Arizona and other U.S. military. Type of aircraft varies but can include other fighter aircraft such as AV-8B, F-35, F-22, and F-18; helicopters such as MV-22 and H-60; and cargo aircraft such as C-130.
Legend: AFB = Air Force Base; ANGB = Air National Guard Base; ATCAA = Air Traffic Control Assigned Airspace; DAF = Department of the Air Force; MOA = Military Operations Area.

Table 5.1-2 Proposed Nighttime Sorties – Alternative 3

MOA/ATCAA	Total Sorties	Nighttime Sorties[1]		Acoustical Night Sorties[2]	
		Percent	Number	Percent	Number
Tombstone	6,900	11	759	2	148
Outlaw/Jackal	7,710	11	848	1	74
Morenci/Reserve	4,050	10	405	1	32
Gladden/Bagdad	9,120	12	1,094	0	42
Sells	17,810	15	2,672	2	331
Ruby/Fuzzy	7,610	10	761	1	71

Note: [1]Night sorties are those flights that occur after sunset.
[2]Acoustical night is defined as 10:00pm to 7:00am. Percentages in this table have been rounded up to the nearest whole number.
Legend: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area.

Table 5.2-1 Noise Levels Attributable to Military Aircraft Operations – Alternative 3

MOA	Alternative 1 – No Action		Alternative 3		Change		FAA Determination of Impact in Noise Sensitive Areas
	DNL (dB)	L_{dnmr} (dB)	DNL (dB)	L_{dnmr} (dB)	DNL (dB)	L_{dnmr} (dB)	
Tombstone A	56.0	56.0	54.7	56.2	-1.3	0.2	Not significant
Tombstone B	53.3	53.3	54.7	56.2	1.4	2.9	Not significant
Tombstone C[1]	<35	<35	54.7	56.2	20 (approximate)	21 (approximate)	Reportable
Tombstone (Exclusion Area)	<35	<35	<35	<35	0	0	Not significant
Jackal	37.3	37.3	49.6	51.9	12	15	Reportable
Jackal Low	48.6	49.7	--	--	--	--	N/A
Outlaw	37.8	37.8	42.5	42.5	5	5	Not significant
Morenci	42.4	42.4	43.1	43.1	1	1	Not significant
Reserve	38.6	38.6	39.2	39.2	1	1	Not significant
Gladden/Bagdad	50.5	50.5	57.6	58.0	7	8	Reportable
Sells	48.5	48.5	49.3	49.3	1	1	Not significant
Fuzzy	57.8	58.6	59.6	60.5	2	2	Not significant
Ruby	44.7	44.7	46.4	46.4	2	2	Not significant

Notes: DNL is the primary metric used by FAA, and L_{dnmr} is the primary metric used by DOD for noise analysis within airspace.
[1]MRNMap software does not calculate values below 35 dB due to difficulty of accurately predicting very low noise levels. Because of this, noise levels attributed to aircraft that range from zero to 34 dB are reported as "< 35 dB". Thus a "change" cannot be quantified since the exact DNL is unknown. In this table, the change shown is the difference from 35 dB and is an approximate value.

Legend: dB = decibel; DNL = Day-Night Sound Level; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level; MOA=Military Operations Area.

Source: Stantec 2023.

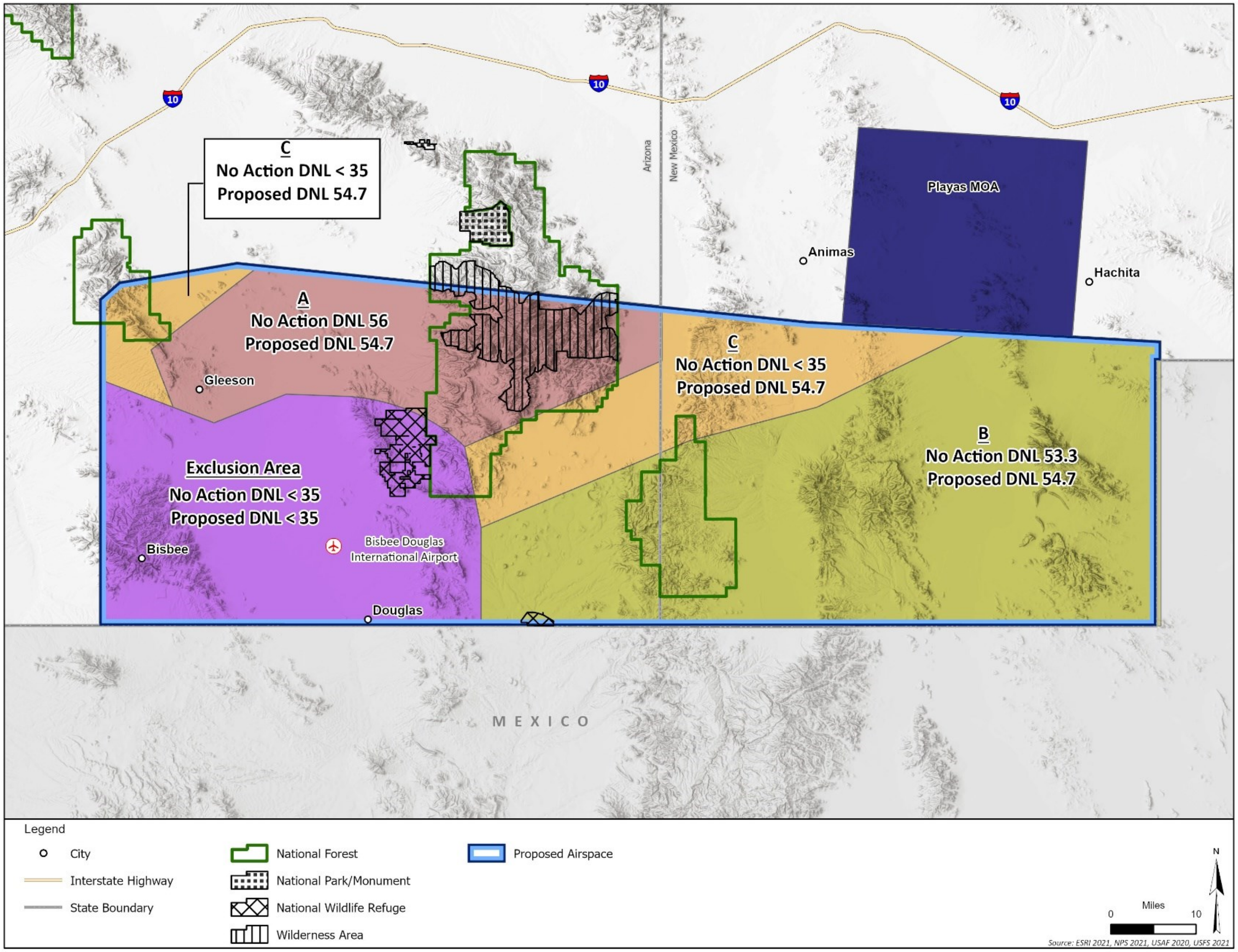

Figure 5.2-1 Subsonic Noise Exposure Changes in Tombstone MOA – Alternative 3

5.3 Supersonic Modeling Data

Under Alternative 3, the proposed supersonic authorizations would be the same as Alternative 2. **Table 5.3-1** shows the numbers of training sorties that would include supersonic flight.

Table 5.3-1 Supersonic Sorties – Alternative 3

MOA/ATCAA	Total Sorties	Supersonic Sorties[1]		Authorized Altitude
		Percent	Number	
Tombstone	6,900	1	69	Above 5,000 feet AGL
Jackal/Outlaw	7,710	14	1,079	Above 5,000 feet AGL
Morenci/Reserve	4,050	11	446	Above 5,000 feet AGL
Gladden/Bagdad	9,120	66	6,019	Above 10,000 feet MSL
Sells	17,810	60	10,686	Above 10,000 feet MSL
Ruby/Fuzzy	7,610	0	0	Not Authorized

Notes: [1]Supersonic speed does not occur for the duration of the sortie, but rather during one or more 30-60 second increments.

Legend: AGL = Above Ground Level; ATCAA=Air Traffic Control Assigned Airspace; MOA=Military Operations Area; MSL = Mean Sea Level.

5.4 Supersonic Noise Exposure

Alternative 3 proposes to lower the supersonic floor to 5,000 feet AGL in Tombstone, Jackal, Outlaw, Morenci, and Reserve which is the same as described under Alternative 2 – Proposed Action. The only minor difference would be the estimated number of sorties that include supersonic speed in the Tombstone, Jackal, and Outlaw MOAs. Under Alternative 3, the number of sorties with supersonic flight would be slightly less than Alternative 2 – Proposed Action in the Tombstone MOA (-11) and slightly higher in the Jackal/Outlaw MOAs (+154). These minor changes would not affect the CDNL contours shown for Alternative 2 – Proposed Action. Thus the supersonic noise exposure under Alternative 3 would be the same as Alternative 2 – Proposed Action (**Section 4.4**).

6.0 ALTERNATIVE 4

This section details the modeling data and the expected noise exposure for Alternative 4. This Alternative would have the same vertical and horizontal changes to the MOAs as Alternative 2 – Proposed Action, but the proposed supersonic altitudes would be higher than proposed under that alternative. The noise model for each MOA/ATCAA is based on the proposed parameters detailed in **Table 6.0-1**. For reference, the existing parameters (No Action) are also provided in this table. Refer to **Figure 4.0-1** for proposed expansion to the Tombstone MOA and **Figure 1.1-1** for horizontal dimensions and general location of the remaining MOAs.

Table 6.0-1 Proposed Parameters of MOAs – Alternative 4

MOA/ATCAA	Floor (Minimum Altitude)		Supersonic Operations	
	Alternative 1 – No Action	Alternative 4	Alternative 1 – No Action	Alternative 4
Tombstone[1]	A/B: 500 feet AGL C: 14,500 feet MSL	100 feet AGL (13,000 feet MSL exclusion area Southwest corner)	Above FL300	Above 10,000 feet AGL
Outlaw	8,000 feet MSL or 3,000 feet AGL	500 feet AGL	Above FL300	Above 10,000 feet AGL
Jackal	11,000 feet MSL or 3,000 feet AGL	500 feet AGL	Above FL300	Above 10,000 feet AGL
Jackal Low	100 feet AGL	No change	Not authorized	No change
Morenci	1,500 feet AGL	No change	Above FL300	Above 10,000 feet AGL
Reserve	5,000 feet AGL	No change	Above FL300	Above 10,000 feet AGL
Bagdad	7,000 feet MSL or 5,000 feet AGL	500 feet AGL	Above 10,000 feet MSL	No change
Gladden	7,000 feet MSL or 5,000 feet AGL	500 feet AGL	Above 10,000 feet MSL	No change
Sells	10,000 feet MSL	No change	Above 10,000 feet MSL	No change
Sells Low	3,000 feet AGL	No change	Not authorized	No change
Ruby	10,000 feet MSL	No change	Not authorized	No change
Fuzzy	100 feet AGL	No change	Not authorized	No change

Note: [1]Under Alternative 4, the horizontal dimensions of Tombstone would be expanded approximately 10 nautical miles to the north.

Legend: AGL = Above Ground Level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; MOA = Military Operations Area; MSL = Mean Sea Level.

6.1 SUBSONIC MODELING DATA

The proposed modifications would allow for non-hazardous training (notably, low-altitude training and supersonic operations at lower altitudes) to occur in more of the MOAs. The proposed sorties for each MOA include sorties that currently occur there and those that could occur there with the proposed optimization, to include the anticipated additional F-35s at Luke AFB. The use of the individual MOAs could fluctuate year to year. The operational data used for the noise analysis includes a 10 percent increase from the No Action operational data to conservatively account for these minor fluctuations in training (**Table 6.1-1**). It should be noted the proposed sorties under Alternative 4 would be the same as those described in Alternative 2 – Proposed Action.

Sorties occur day and night in the MOAs as shown in **Table 6.1-2**. The percentage of sorties that occur at night would not change under Alternative 4. For operational purposes, nighttime sorties refer to those sorties that occur after sunset. For noise modeling purposes, acoustical night is defined as after 10:00 p.m. and before 7:00 a.m. The percentage of sorties that could occur during "acoustical night" are also provided in **Table 6.1-2**.

Table 6.1-1 Proposed Annual Sorties – Alternative 4

MOA/ATCAA	No Action	Proposed								Change from No Action
		Davis-Monthan AFB	Morris ANGB	Luke AFB		Other[1]	Total Local	Transient[2]	Grand Total	
		A-10	F-16	F-16	F-35					
Tombstone	3,450	6,600	1,100	0	0	150	7,850	150	8,000	+4,550
Outlaw/Jackal	5,190	2,100	3,400	20	750	40	6,310	300	6,610	+1,420
Morenci/Reserve	3,350	850	2,900	0	150	0	3,900	150	4,050	+700
Gladden/Bagdad	6,920	20	0	1,600	7,300	0	8,920	200	9,120	+2,200
Sells	14,790	350	3,100	1,400	11,600	60	16,510	1,300	17,810	+3,020
Ruby/Fuzzy	5,490	2,300	4,200	20	850	40	7,410	200	7,610	+2,120

Notes: [1] Other includes non-fighter aircraft stationed in Arizona (EC-130Hs, HC-130Js, HH-60Gs).
[2] Transients include DAF units stationed outside Arizona and other U.S. military. Type of aircraft varies but can include other fighter aircraft such as AV-8B, F-35, F-22, and F-18; helicopters such as MV-22 and H-60; and cargo aircraft such as C-130.

Legend: AFB = Air Force Base; ANGB = Air National Guard Base; ATCAA = Air Traffic Control Assigned Airspace; DAF = Department of the Air Force; MOA = Military Operations Area.

Table 6.1-2 Proposed Nighttime Sorties – Alternative 4

MOA/ATCAA	Total Sorties	Nighttime Sorties[1]		Acoustical Night Sorties[2]	
		Percent	Number	Percent	Number
Tombstone	8,000	11	880	2	171
Outlaw/Jackal	6,610	11	727	1	63
Morenci/Reserve	4,050	10	405	1	32
Gladden/Bagdad	9,120	12	1,094	0	42
Sells	17,810	15	2,672	2	331
Ruby/Fuzzy	7,610	10	761	1	71

Note: [1]Night sorties are those flights that occur after sunset.
[2]Acoustical night is defined as 10:00pm to 7:00am. Percentages in this table have been rounded up to the nearest whole number.

Legend: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area.

6.2 SUBSONIC NOISE EXPOSURE

Table 6.2-1 shows the L_{dnmr} and DNL levels for the No Action and Alternative 4 within the MOAs. Since the proposed sorties within each MOA under Alternative 4 would be the same as Alternative 2 – Proposed Action, the subsonic noise exposure discussion is the same as **Section 4.2**.

Table 6.2-1 Noise Levels Attributable to Military Aircraft Operations Alternative 4

MOA	Alternative 1 - No Action		Alternative 4		Change		FAA Determination of Impact in Noise Sensitive Areas
	DNL (dB)	L_{dnmr} (dB)	DNL (dB)	L_{dnmr} (dB)	DNL (dB)	L_{dnmr} (dB)	
Tombstone A	56.0	56.0	53.6	55.1	-2.4	-0.9	Not significant
Tombstone B	53.3	53.3	53.6	55.1	0.3	1.8	Not significant
Tombstone C[1]	<35	<35	53.6	55.1	18 (approximate)	20 (approximate)	Reportable
Tombstone (Proposed Expansion)[2]	--	--	53.6	55.1	--	--	Reportable
Tombstone (Exclusion Area)	<35	<35	<35	<35	0	0	Not significant
Jackal	37.3	37.3	47.3	47.7	10	10	Reportable
Jackal Low	48.6	49.7	55.8	59.1	7	9	Reportable
Outlaw	37.8	37.8	42.5	42.5	5	5	Not significant
Morenci	42.4	42.4	43.1	43.1	1	1	Not significant
Reserve	38.6	38.6	39.2	39.2	1	1	Not significant
Gladden/Bagdad	50.5	50.5	57.6	58.0	7	8	Reportable
Sells	48.5	48.5	49.3	49.3	1	1	Not significant
Fuzzy	57.8	58.6	59.6	60.5	2	2	Not significant
Ruby	44.7	44.7	46.4	46.4	2	2	Not significant

Notes: DNL is the primary metric used by FAA, and L_{dnmr} is the primary metric used by DOD for noise analysis within airspace.
[1]MRNMap software does not calculate values below 35 dB due to difficulty of accurately predicting very low noise levels. Because of this, noise levels attributed to aircraft that range from zero to 34 dB are reported as "< 35 dB". Thus a "change" cannot be quantified since the exact DNL is unknown. In this table, the change shown is the difference from 35 dB and is an approximate value.
[2]MRNMap calculates DNL/L_{dnmr} for military aircraft activity. There is currently no military aircraft activity in the proposed expansion area of Tombstone, thus there is no modeled DNL or L_{dnmr} to calculate a "change".
Legend: dB = decibel; DNL = Day-Night Sound Level; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level; MOA=Military Operations Area.
Source: Stantec 2023.

6.3 SUPERSONIC MODELING DATA

Under Alternative 4, supersonic training would occur at lower altitudes, but not as low as that proposed under Alternative 2. **Table 6.3-1** shows the numbers of training sorties that would include supersonic flight.

Table 6.3-1 Supersonic Sorties – Alternative 4

MOA/ATCAA	Total Sorties	Supersonic Sorties[2]		Authorized Altitude
		Percent	Number	
Tombstone	8,000	1	80	Above 10,000 feet AGL
Jackal/Outlaw	6,610	14	925	Above 10,000 feet AGL
Morenci/Reserve	4,050	11	446	Above 10,000 feet AGL
Gladden/Bagdad	9,120	66	6,019	Above 10,000 feet MSL
Sells	17,810	60	10,686	Above 10,000 feet MSL
Ruby/Fuzzy	7,610	0	0	Not Authorized

Notes: [1] Supersonic speed does not occur for the duration of the sortie, but rather during one or more 30-60 second increments.

Legend: AGL = Above Ground Level; ATCAA=Air Traffic Control Assigned Airspace; MOA=Military Operations Area; MSL = Mean Sea Level.

6.4 Supersonic Noise Exposure

The standard measure of the noise levels produced by supersonic flight is CDNL, the average of all the sound energy produced by supersonic activity. Production of sonic booms depends on many variables, and use of the CDNL metric helps to average them all out over time. A specific, single location may or may not experience boom activity, although a location inside the depicted CDNL contours would experience some infrequent, low-level booms. **Figure 6.4-1** shows the predicted CDNL contours attributed to annual supersonic activity for Alternative 4 in the Jackal, Outlaw, Morenci, and Reserve MOAs/ATCAAs. The supersonic noise in Gladden/Bagdad and Sells would be the same as illustrated in Alternative 2 – Proposed Action. The supersonic noise in Tombstone MOA is too low to accurately model. **Table 6.4-1** shows the maximum calculated supersonic noise value (CDNL) from military aircraft supersonic operations within each MOA/ATCAA under Alternative 4.

Table 6.4-1 Supersonic Noise from Military Aircraft –Alternative 4

MOA/ATCAA	Alternative 1 – No Action Maximum CDNL (dBC)	Alternative 4 Maximum CDNL (dBC)	Change (dBC)
Tombstone[1]	n/a	<35	n/a
Jackal/Outlaw/Morenci/ Reserve	35	43	8
Gladden/Bagdad	50	52	2
Sells[2]	55	55	<1

Note: [1]Tombstone is authorized for supersonic operations under the No Action but currently no supersonic operations occur. The CDNL under Alternative 4 is too low to model, thus a specific change is not calculable.
[2]The CDNL values for Alternative 1 and Alternative 4 in Sells MOA both round to 55, although there is a small difference of less than 1dBC.

Legend: ATCAA = Air Traffic Control Assigned Airspace; CDNL = C-weighted Day-Night Average Sound Level; dBC = C-weighted decibel; MOA = Military Operations Area.

Source: Stantec 2023.

Figure 6.4-1 shows the Alternative 4 CDNL contours for the Jackal, Outlaw, Morenci, and Reserve MOAs, compared to the No Action CDNL contours. Under Alternative 4, the CDNL is 8 dBC greater than under Alternative 1 – No Action. This is the result of the supersonic altitude being lowered from FL300 to 10,000 feet AGL. The highest CDNL level in all four MOAs would only be 43 dBC, well below the level expected to cause annoyance.

The changes in the Gladden/Bagdad and Sells MOAs in **Table 6.4-1** are identical to those for Alternative 2, discussed in **Section 4.4**.

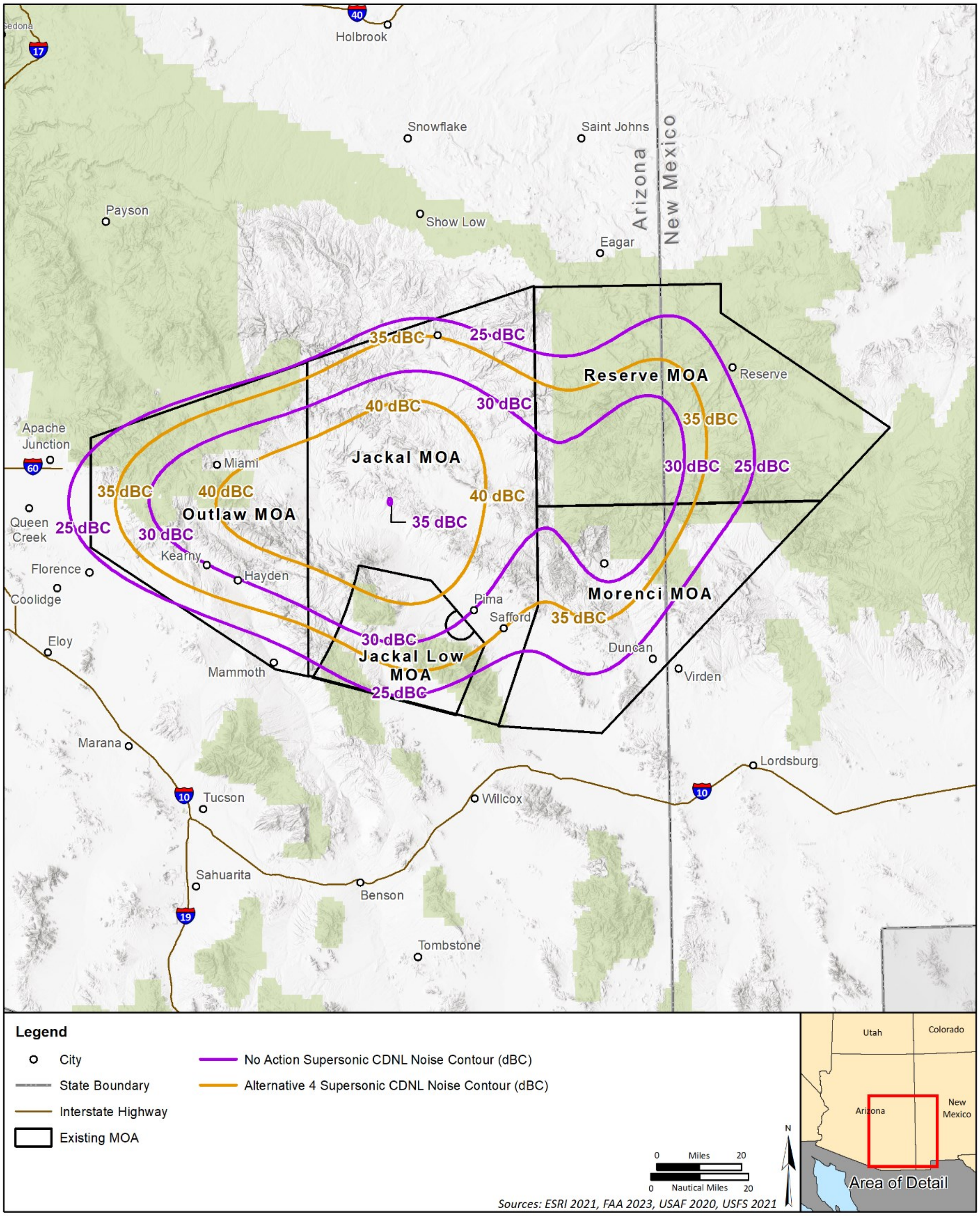

Figure 6.4-1 CDNL Contours for Jackal/Outlaw/Morenci/Reserve MOAs – Alternative 4

7.0 SINGLE EVENT METRICS

Sections 3.0, 4.0, 5.0, and 6.0 of this report provide estimates of noise modeled for No Action (Alternative 1) conditions as well as the three proposed alternative (Alternatives 2, 3, and 4) scenarios being considered. Noise levels in these sections were provided in DNL and L_{dnmr}, and CDNL cumulative metrics that provide a measure of exposure to noise over a long period of time. While these metrics are the U.S. Government standard metrics for assessing noise impacts, supplemental metrics are used to produce more detailed noise exposure information for decision makers and to improve communication with the public and stakeholders. Supplemental metrics are not intended to replace the DNL, L_{dnmr}, and CDNL metrics as the primary descriptor of cumulative noise exposure and anticipated significance of impacts, but rather are useful tools to supplement the impact information disclosed by the DNL metric. Cumulative metrics do not provide information on the "loudness" of an aircraft flying in the vicinity of an observer. Therefore, this section provides single event peak noise levels for subsonic overflights and single sonic boom overpressure calculations.

7.1 SUBSONIC SINGLE EVENT CALCULATIONS

Two metrics were calculated to describe the loudness of an overflight event: L_{max} and the SEL (see **Section 2.2,** *Single Event Metrics*, for a description). Calculating these metrics requires consideration of a variety of aircraft power settings, airspeeds, and flight altitudes. Power settings can employ full power (known as military or "mil" thrust) or use of engine afterburner, the loudest power setting. Use of the afterburner in training is limited because of the high fuel consumption and is generally only used in the higher altitudes.

Another factor that drastically affects the loudness of an overflight is the distance between the aircraft and the observer. As the distance between an overflight and the observer increases, the noise level decreases. To illustrate this effect, relevant scenarios were developed to quantify the noise levels at various lateral offsets from the overflight:

- *Scenario 1:* Overflight at the lowest possible altitude (100 feet AGL). This altitude is currently only available in the Jackal Low and Fuzzy MOAs but would be available in the Tombstone MOA (Alternatives 2, 3, and 4) and Jackal MOA (Alternative 3).
- *Scenario 2:* Overflight at 500 feet AGL. This lower altitude would be available in more MOAs in the region to include the Bagdad, Gladden, Outlaw, and Jackal MOAs.
- *Scenario 3:* Overflight at 10,000 feet AGL, above which most of training time is spent. This represents the most common single event exposure.

The L_{max} and SEL calculations for these scenarios are provided in **Tables 7.1-1 through 7.1-3.** These tables show that overflight sound levels rapidly drop off when the overflight is not directly overhead. A lateral offset of 1,000 or 5,000 feet reduces the noise considerably.

Table 7.1-1 L_{max} and SEL Values (in dB) for F-16C Overflights at Different Power Settings, Altitudes and Lateral Offsets[1]

Offset (feet lateral distance)	Scenario 1: Aircraft Altitude – 100 feet AGL				Scenario 2: Aircraft Altitude - 500 feet AGL				Scenario 3: Aircraft Altitude - 10,000 feet AGL			
	L_{max}		SEL		L_{max}		SEL		L_{max}		SEL	
	MIL	A/B	MIL	A/B	MIL	A/B	MIL	A/B	MIL	A/B	MIL	A/B
0	124-128	127-131	126-130	129-133	113-116	116-120	116-119	119-122	82-85	86-90	85-88	89-93
1,000	106-109	109-113	109-112	112-116	106-109	109-113	109-112	112-116	82-85	86-90	85-88	89-93
5,000	85-88	88-91	88-91	91-94	90-93	93-97	93-96	96-100	80-83	85-88	83-86	88-91

Note: [1]A range of values is provided for each metric since the F-16 variants flown by DAF F-16s in Arizona have two different engine types. The speed used for these models was 450 knots.

Legend: A/B = Afterburner Thrust; AGL = Above Ground Level; L_{max}=maximum sound level; MIL = Military-rated thrust; SEL=Sound Exposure Level.

Table 7.1-2 L_{max} and SEL Values (in dB) for F-35A Overflights at Different Power Settings, Altitudes and Lateral Offsets[1]

Offset (feet lateral distance)	Scenario 1: Aircraft Altitude – 100 feet AGL				Scenario 1: Aircraft Altitude - 500 feet AGL				Scenario 2: Aircraft Altitude - 10,000 feet AGL			
	L_{max}		SEL		L_{max}		SEL		L_{max}		SEL	
	MIL	A/B	MIL	A/B	MIL	A/B	MIL	A/B	MIL	A/B	MIL	A/B
0	129	131	121	134	117	121	120	124	87	92	90	95
1,000	110	114	114	118	110	115	113	118	87	92	90	95
5,000	89	94	92	97	94	99	97	102	85	91	88	94

Note: [1]The speed used for these models was 450 knots.

Legend: A/B = Afterburner Thrust; AGL = Above Ground Level; L_{max}=maximum sound level; MIL = Military-rated thrust; SEL=Sound Exposure Level.

Table 7.1-3 L_{max} and SEL Values (in dB) for A-10 Overflights at Different Altitudes and Lateral Offsets[1]

Offset (feet lateral distance)	Scenario 1: Aircraft Altitude – 100 feet AGL		Scenario 2: Aircraft Altitude – 500 feet AGL		Scenario 3: Aircraft Altitude – 10,000 feet AGL	
	L_{max}	SEL	L_{max}	SEL	L_{max}	SEL
	MIL	MIL	MIL	MIL	MIL	MIL
0	113	115	102	104	72	75
1,000	96	99	96	99	72	75
5,000	77	80	81	84	70	73

Note: [1]The speed used for these models was 300 knots.

Legend: AGL = Above Ground Level; L_{max}=maximum sound level; MIL = Military-rated thrust; SEL=Sound Exposure Level.

Figures 7.1-1, 7.1-2, and 7.1-3 provide a graphical depiction of the L_{max} data for an example overflight of an F-16 at 100 feet AGL, 500 feet AGL, and 10,000 feet AGL. The thickness of the orange band on each graph shows the range of values resulting from differences in power settings. The top edge represents the F-16 using an afterburner and the bottom edge represents the F-16 at mil thrust power. While afterburner use is generally employed at higher altitudes, use of afterburner at lower altitudes is allowed and has been used to represent the loudest possible scenario. The L_{max} (which is the peak noise level) occurs for about 1/8 of a second. To provide a frame of reference, additional lines are shown to illustrate the average noise level for common noise sources. As illustrated, the peak noise level (L_{max}) rapidly declines the further from the overflight.

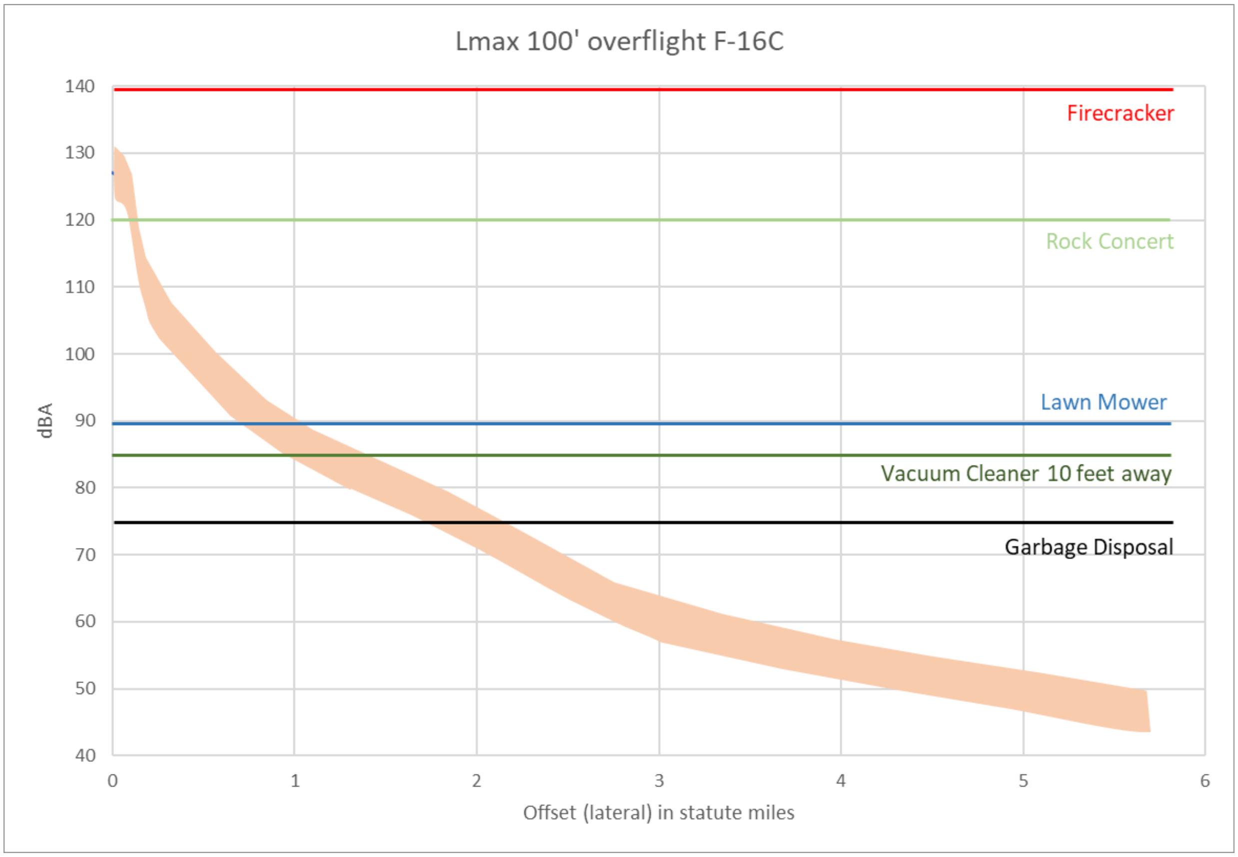

Figure 7.1-1 L_{max} for F-16 Overflight at 100 feet

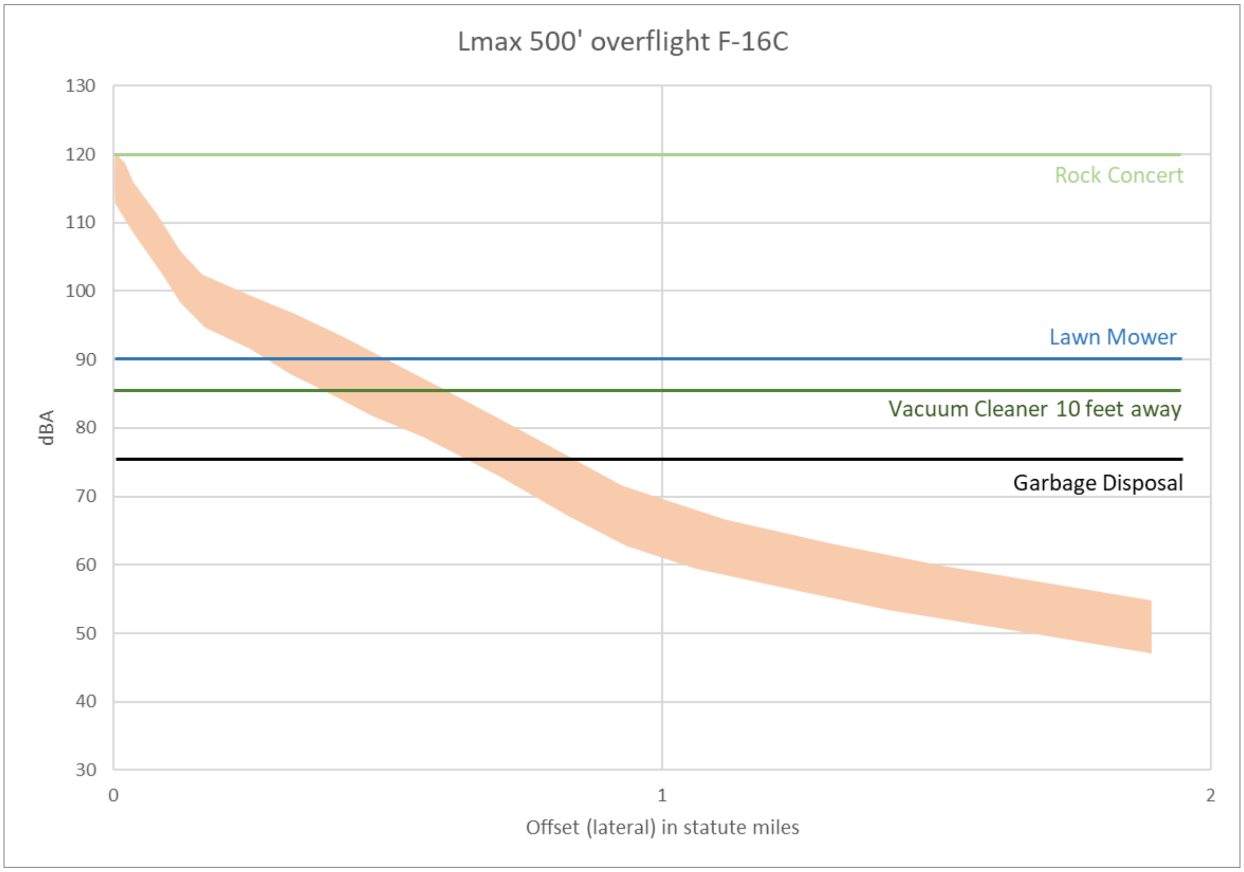

Figure 7.1-2 L_{max} for F-16 Overflight at 500 feet

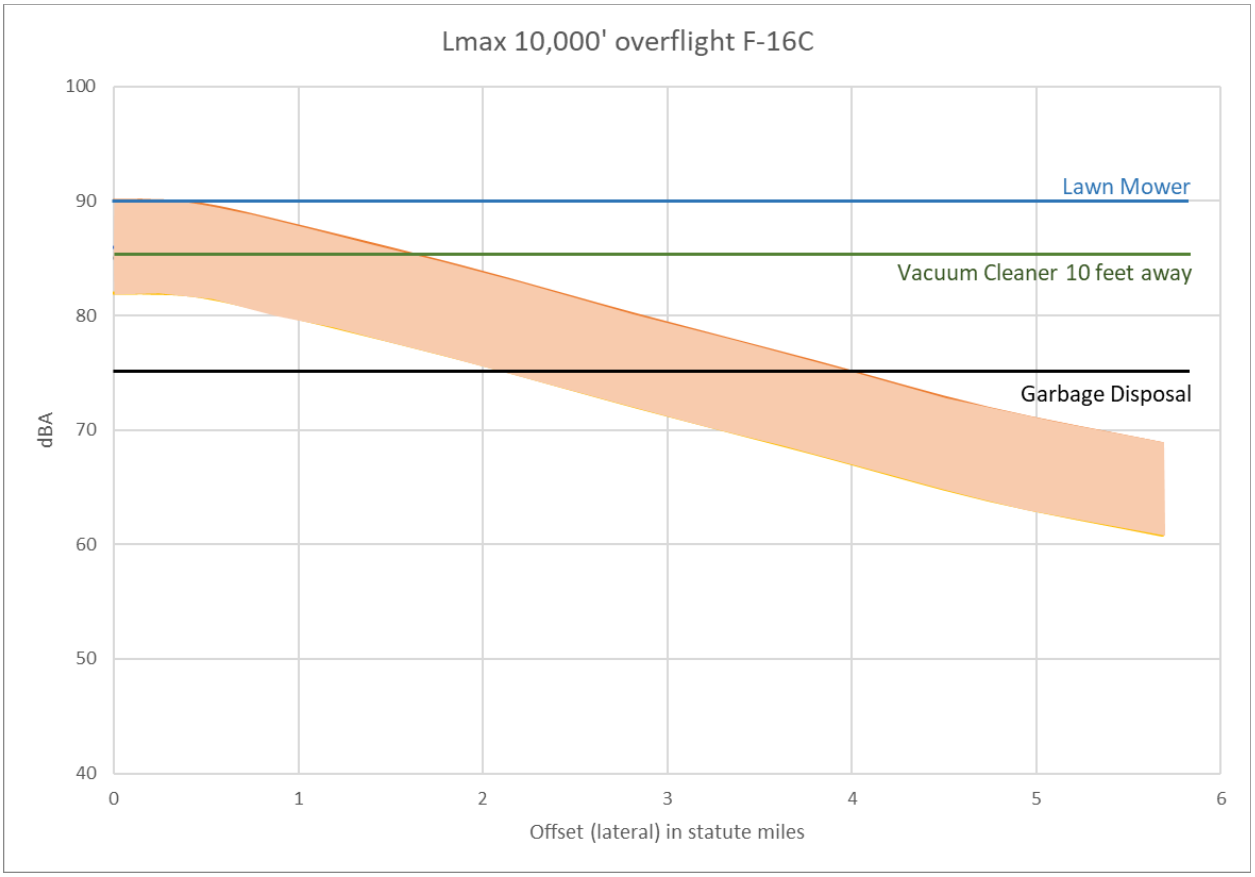

Figure 7.1-3 L_{max} for F-16 Overflight at 10,000 feet

7.2 Sonic Boom Calculations

Table 7.2-1 shows calculated over pressures in psf for F-16 and F-35 aircraft at various speeds and altitudes. These values assume steady, level flight at these speeds. These scenarios are representative of the sonic boom events that currently occur and could occur from lowering the authorized supersonic altitude in several MOAs and are applicable to all alternatives analyzed in the EIS.

Sonic boom intensity varies upward or downward from the values in **Table 7.2-1** for aircraft executing maneuvers while flying at supersonic speeds. Plotkin (1990) noted that aircraft maneuvers may create "focus booms" with overpressures 2 to 5 times the magnitude of steady state sonic booms. Due to the many variables involved in the training use of the existing and proposed MOAs/ATCAAs, it is impossible to predict when and where sonic booms or focus booms may occur.

Table 7.2-1 Typical Sonic Boom Overpressures for Relevant Fighter Aircraft (pounds per square foot)

Aircraft Type[1]	Altitude and Speed					
	5,000 feet AGL		10,000 feet AGL		30,000 feet AGL	
	Mach 1.2	Mach 1.4	Mach 1.2	Mach 1.4	Mach 1.2	Mach 1.4
F-16C	7.5	8.3	4.2	4.7	1.5	1.6
F-35A	8.4	9.4	4.9	5.3	1.7	1.8

Note: [1]A-10s do not fly supersonic, thus overpressures were not calculated.
Legend: AGL = above ground level.

Tests by the Air Force on sonic booms have found that most structures in good condition should not be affected by sonic booms with a peak overpressure of less than 16 psf. Typically, community exposure to sonic booms is less than 2 psf. Tests by the National Aeronautics and Space Administration have shown that structures in good condition are undamaged by overpressures of up to 11 psf. Damage to plaster is in a comparable range of glass but depends on the condition of the plaster. Adobe faces risks similar to plaster, but assessment is complicated by adobe structures being exposed to weather, where they can deteriorate in the absence of any specific loads. At 1 psf, the probability of a window breaking ranges from one in a billion (Plotkin and Sutherland 1990) to one in a million (Hershey and Higgins 1976) with the probability depending on boom magnitude, boom angle of incidence, and the condition of the window. In general, structural damage from sonic booms should be expected only for overpressures over 10 psf.

8.0 SUMMARY OF SUBSONIC AND SUPERSONIC RESULTS

Tables 8.0-1 and **8.0-2** provide a summary of results for subsonic and supersonic modeling for each alternative.

Table 8.0-1 Subsonic Noise Impacts Summary

MOA	Alternative 1 – No Action		Alternative 2 – Proposed Action				Alternative 3				Alternative 4			
	DNL (dB)	L_{dnmr} (dB)	DNL (dB)	Change (dB)	L_{dnmr} (dB)	Change (dB)	DNL (dB)	Change (dB)	L_{dnmr} (dB)	Change (dB)	DNL (dB)	Change (dB)	L_{dnmr} (dB)	Change (dB)
Tombstone A	56	56	53.6	-2.4	55.1	-0.9	54.7	-1.3	56.2	0.2	53.6	-2.4	55.1	-0.9
Tombstone B	53.3	53.3	53.6	0.3	55.1	1.8	54.7	1.4	56.2	2.9	53.6	0.3	55.1	1.8
Tombstone C[1]	<35	<35	53.6	18 (approx)	55.1	21 (approx)	54.7	20 (approx)	56.2	21 (approx)	53.6	18 (approx)	55.1	21 (approx)
Tombstone (Proposed Expansion)[2]	n/a	n/a	53.6	--	55.1	--	n/a	n/a	n/a	n/a	53.6	--	55.1	--
Tombstone (Exclusion Area)	<35	<35	<35	0	<35	0	<35	0	<35	0	<35	0	<35	0
Jackal	37.3	37.3	47.3	10	47.7	10	49.6	12	51.9	15	47.3	10	47.7	10
Jackal Low	48.6	49.7	55.8	7	59.1	9	--	--	--	--	55.8	7	59.1	9
Outlaw	37.8	37.8	42.5	5	42.5	5	42.5	5	42.5	5	42.5	5	42.5	5
Morenci	42.4	42.4	43.1	1	43.1	1	43.1	1	43.1	1	43.1	1	43.1	1
Reserve	38.6	38.6	39.2	1	39.2	1	39.2	1	39.2	1	39.2	1	39.2	1
Gladden/Bagdad	50.5	50.5	57.6	7	58	8	57.6	7	58	8	57.6	7	58	8
Sells	48.5	48.5	49.3	1	49.3	1	49.3	1	49.3	1	49.3	1	49.3	1
Fuzzy	57.8	58.6	59.6	2	60.5	2	59.6	2	60.5	2	59.6	2	60.5	2
Ruby	44.7	44.7	46.4	2	46.4	2	46.4	2	46.4	2	46.4	2	46.4	2

Notes: DNL is the primary metric used by FAA, and L_{dnmr} is the primary metric used by DoD for noise analysis within airspace.
[1]MRNMap software does not calculate values below 35 dB due to difficulty of accurately predicting very low noise levels. Because of this, noise levels attributed to aircraft that range from zero to 34 dB are reported as "< 35 dB". Thus a "change" cannot be quantified since the exact DNL is unknown. In this table, the change shown is the difference from 35 dB and is an approximate value.
[2]MRNMap calculates DNL/L_{dnmr} for military aircraft activity. There is currently no military aircraft activity in the proposed expansion area of Tombstone, thus there is no modeled DNL or L_{dnmr} to calculate a "change".

Legend: < = less than; approx = approximate; dB = decibel; DNL = Day-Night Sound Level; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level; MOA=Military Operations Area; n/a = not applicable.

Source: Stantec 2023.

Table 8.0-2 Supersonic Noise Impacts Summary

MOA/ATCAA	Alternative 1 – No Action	Alternative 2 – Proposed Action		Alternative 3		Alternative 4	
	CDNL (dBC)	CDNL (dBC)	Change (dBC)	CDNL (dBC)	Change (dBC)	CDNL (dBC)	Change (dBC)
Tombstone[1]	n/a	<35	n/a	<35	n/a	<35	n/a
Jackal/Outlaw/Morenci/Reserve	35	44	9	44	9	43	8
Gladden/Bagdad	50	52	2	52	2	52	2
Sells[2]	55	55	<1	55	<1	55	<1

Note: [1]Tombstone is authorized for supersonic operations under the No Action but currently no supersonic operations occur. The CDNL under Alternatives 2, 3, and 4 are too low to model, thus a specific change is not calculable.
[2]The CDNL values for Alternatives 1, 2, and 3 in Sells MOA both round to 55, although there is a small difference of less than 1 dBC.

Legend: < = less than; dBC = C-weighted decibel; CDNL = C-weighted Day-Night Sound Level; MOA=Military Operations Area; n/a = not applicable.

Source: Stantec 2023.

9.0 REFERENCES

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APPENDIX A
MODEL INPUT DATA

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LUKE F-16s

Sells MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
24k - FL390	20%	MAX	30%	0.9 M
		MIL	35%	
		85%	5%	
10-24k MSL	65%	MAX	30%	0.85 M
		MIL	60%	
		85%	10%	
3000 AGL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
24k - FL390	20%	MAX	30%	0.9 M
		MIL	35%	
		85%	5%	
10-24k MSL	65%	MAX	30%	0.85 M
		MIL	60%	
		85%	10%	
3000 AGL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	

Ruby MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
24k - FL510	5%	MAX	5%	350 kts
		MIL	55%	
		85%	40%	
18-24k MSL	90%	MAX	5%	350 kts
		MIL	55%	
		85%	40%	
10-18k MSL	5%	MAX	5%	400 kts
		MIL	55%	
		85%	40%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
24k - FL510	5%	MAX	5%	350 kts
		MIL	55%	
		85%	40%	
18-24k MSL	90%	MAX	5%	350 kts
		MIL	55%	
		85%	40%	
10-18k MSL	5%	MAX	5%	400 kts
		MIL	55%	
		85%	40%	

Jackal LOW

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
1500 - 3k AGL/11k MSL	30%	MAX	20%	450 kts
		MIL	60%	
		85%	15%	
300 - 1500 AGL	70%	MAX	20%	450 kts
		MIL	65%	
		85%	15%	
100 - 300 AGL	0%	MAX	0%	0 kts
		MIL	0%	
		85%	0%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
300 - 500k MSL	20%	MAX	20%	450 kts
		MIL	65%	
		85%	15%	

Jackal HIGH

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL390	20%	MAX	30%	0.9 M
		MIL	65%	
		85%	5%	
10k MSL - 24k MSL	65%	MAX	30%	0.85M
		MIL	60%	
		85%	10%	
3kAGL/11k MSL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL510	15%	MAX	30%	0.9 M
		MIL	65%	
		85%	5%	
10k MSL - 24k MSL	55%	MAX	60%	0.85M
		MIL	60%	
		85%	10%	
3k AGL/11k MSL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	
500 AGL - 3k AGL/11k MSL	15%	MAX	20%	450 kts
		MIL	60%	
		85%	20%	

Alternative 3

10k MSL - 24k MSL	50%	MAX	60%	0.85M
		MIL	60%	
		85%	10%	
3k AGL/11k MSL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	
500 - 3k AGL/11k MSL	15%	MAX	20%	450 kts
		MIL	60%	
		85%	20%	
100 AGL - 500 AGL	5%	MAX	20%	450 kts
		MIL	60%	
		85%	20%	

Outlaw MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL390	20%	MAX	30%	0.9 M
		MIL	65%	
		85%	5%	
10k MSL - 24k MSL	65%	MAX	30%	0.85M
		MIL	60%	
		85%	10%	
3kAGL/11k MSL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL510	15%	MAX	30%	0.9 M
		MIL	65%	
		85%	5%	
10k MSL - 24k MSL	55%	MAX	60%	0.85M
		MIL	60%	
		85%	10%	
3k AGL/11k MSL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	
500 AGL - 3k AGL/11k MSL	15%	MAX	20%	450 kts
		MIL	60%	
		85%	20%	

Gladden/Bagdad MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
FL280 - FL390	10%	MAX	40%	0.85 M
		MIL	50%	
		85%	10%	
20k MSL - FL280	25%	MAX	30%	0.85M
		MIL	60%	
		85%	10%	
10k MSL - 20k MSL	50%	MAX	40%	400 kts
		MIL	40%	
		85%	20%	
5k AGL/7k MSL - 10k MSL	15%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
FL280 - FL510	10%	MAX	40%	0.85M
		MIL	50%	
		85%	10%	
20k MSL -FL280	15%	MAX	30%	0.85M
		MIL	60%	
		85%	10%	
10k MSL - 20k MSL	50%	MAX	40%	400 kts
		MIL	40%	
		85%	20%	
3K AGL - 10k MSL	5%	MAX	20%	400 kts
		MIL	60%	
		85%	20%	
1500 AGL - 3k AGL	5%	MAX	20%	450 kts
		MIL	60%	
		85%	20%	
500 AGL - 1500 AGL	15%	MAX	20%	450 kts
		MIL	60%	
		85%	20%	

162nd F-16

Sells MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
		MAX	25%	
34k MSL - FL390	5%	MIL	7%	0.9 M
		85%	5%	
		MAX	15%	
24k MSL - 34k MSL	15%	MIL	80%	0.85 M
		85%	5%	
		MAX	5%	
20k MSL - 24k MSL	25%	MIL	60%	400 kts
		85%	35%	
		MAX	10%	
10k MSL - 20k MSL	45%	MIL	30%	400 kts
		85%	60%	
		MAX	5%	
3k AGL - 10k MSL	10%	MIL	65%	400 kts
		85%	30%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
		MAX	25%	
34k MSL - FL390	5%	MIL	7%	0.9 M
		85%	5%	
		MAX	15%	
24k MSL - 34k MSL	15%	MIL	80%	0.85 M
		85%	5%	
		MAX	5%	
20k MSL - 24k MSL	25%	MIL	60%	400 kts
		85%	35%	
		MAX	10%	
10k MSL - 20k MSL	45%	MIL	30%	400 kts
		85%	60%	
		MAX	5%	
3k AGL - 10k MSL	10%	MIL	65%	400 kts
		85%	30%	

Ruby/Fuzzy MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
		MAX	15%	
10k MSL - 50k MSL	75%	MIL	60%	0.9 M
		85%	25%	
		MAX	5%	
5k MSL - 10k MSL	10%	MIL	65%	0.85 M
		85%	30%	
		MAX	10%	
3k AGL - 5k MSL	5%	MIL	70%	400 kts
		85%	20%	
		MAX	10%	
300 AGL - 3k AGL	10%	MIL	70%	400 kts
		85%	20%	
		MAX	0%	
100 AGL - 300 AGL	0%	MIL	0%	
		85%	0%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
		MAX	15%	
10k MSL - 50k MSL	75%	MIL	60%	0.9 M
		85%	25%	
		MAX	5%	
5k MSL - 10k MSL	10%	MIL	65%	0.85 M
		85%	30%	
		MAX	10%	
3k AGL - 5k MSL	5%	MIL	70%	400 kts
		85%	20%	
		MAX	10%	
300 AGL - 3k AGL	10%	MIL	70%	400 kts
		85%	20%	
		MAX	0%	
100 AGL - 300 AGL	0%	MIL	0%	
		85%	0%	

Jackal LOW MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
		MAX	5%	
5k AGL - 11k MSL	20%	MIL	65%	0.9 M
		85%	30%	
		MAX	10%	
3k AGL - 5k AGL	20%	MIL	70%	0.85 M
		85%	20%	
		MAX	10%	
300 AGL - 3k AGL	60%	MIL	70%	400 kts
		85%	20%	
		MAX	0%	
100 AGL - 300 AGL	0%	MIL	0%	
		85%	0%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
		MAX	10%	
100 AGL - 500 AGL	2%	MIL	70%	400 kts
		85%	20%	

Jackal HIGH

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL290	10%	MAX	10%	0.9 M
		MIL	70%	
		85%	20%	
20k MSL - 24k MSL	40%	MAX	5%	0.85M
		MIL	60%	
		85%	35%	
3kAGL/11k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	30%	
		85%	60%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL510	20%	MAX	10%	0.9 M
		MIL	70%	
		85%	20%	
20k MSL - 24k MSL	25%	MAX	5%	0.85M
		MIL	60%	
		85%	35%	
10k MSL - 20k MSL	30%	MAX	10%	400 kts
		MIL	30%	
		85%	60%	
5k AGL - 10k MSL	10%	MAX	5%	450 kts
		MIL	65%	
		85%	30%	
3k AGL - 5k AGL	5%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	
500 AGL - 3k AGL	10%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	

Alternative 3

500 AGL - 3k AGL	8%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	
300 AGL - 500 AGL	2%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	
100 AGL - 300 AGL	0%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	

Outlaw MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL290	5%	MAX	10%	0.85 M
		MIL	70%	
		85%	20%	
20k MSL - 24k MSL	25%	MAX	5%	0.85M
		MIL	60%	
		85%	35%	
10k MSL - 20k MSL	65%	MAX	10%	400 kts
		MIL	30%	
		85%	60%	
3k AGL/8k MSL - 8k MSL	5%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
24k MSL - FL510	20%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
20k MSL -24k MSL	25%	MAX	50%	0.85M
		MIL	60%	
		85%	35%	
10k MSL - 20k MSL	30%	MAX	10%	400 kts
		MIL	30%	
		85%	60%	
5k AGL - 10k MSL	10%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	
3k AGL - 5k AGL	5%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	
500 AGL - 3k AGL	10%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	

Morenci MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
34k MSL - FL510	10%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
24k MSL - 34k MSL	20%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
20k MSL - 24k MSL	35%	MAX	5%	400 kts
		MIL	60%	
		85%	35%	
10k MSL - 20k MSL	25%	MAX	10%	400 kts
		MIL	30%	
		85%	60%	
5k AGL - 10k MSL	5%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	
3k AGL - 5k AGL	3%	MAX	10%	400 kts
		MIL	70%	
		85%	20%	
1500 AGL - 3k AGL	2%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
34k MSL - FL510	10%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
24k MSL - 34k MSL	20%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
20k MSL - 24k MSL	35%	MAX	5%	400 kts
		MIL	60%	
		85%	35%	
10k MSL - 20k MSL	25%	MAX	10%	400 kts
		MIL	30%	
		85%	60%	
5k AGL - 10k MSL	5%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	
3k AGL - 5k AGL	3%	MAX	10%	400 kts
		MIL	70%	
		85%	20%	
1500 AGL - 3k AGL	2%	MAX	10%	450 kts
		MIL	70%	
		85%	20%	

Reserve MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
34k MSL - FL510	10%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
24k MSL - 34k MSL	20%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
20k MSL - 24k MSL	40%	MAX	5%	400 kts
		MIL	60%	
		85%	35%	
10k MSL - 20k MSL	25%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	
5k AGL - 10k MSL	5%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
34k MSL - FL510	10%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
24k MSL - 34k MSL	20%	MAX	10%	0.85M
		MIL	70%	
		85%	20%	
20k MSL - 24k MSL	40%	MAX	5%	400 kts
		MIL	60%	
		85%	35%	
10k MSL - 20k MSL	25%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	
5k AGL - 10k MSL	5%	MAX	5%	400 kts
		MIL	65%	
		85%	30%	

DM A-10s

Sells MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
10k AGL - 19k MSL	5%	MIL	75%	250 kts
		85%	25%	
5k AGL - 10k MSL	10%	MIL	75%	250 kts
		85%	25%	
3k AGL - 5k AGL	85%	MIL	75%	300 kts
		85%	25%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
10k AGL - 19k MSL	5%	MIL	75%	250 kts
		85%	25%	
5k AGL - 10k MSL	10%	MIL	75%	250 kts
		85%	25%	
3k AGL - 5k AGL	85%	MIL	75%	300 kts
		85%	25%	

Ruby MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
18k MSL - 23k MSL	10%	MIL	100%	220 kts
		85%	0%	
15k MSL - 18k MSL	10%	MIL	50%	250 kts
		85%	50%	
10k MSL - 15k MSL	80%	MIL	50%	250 kts
		85%	50%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
18k MSL - 23k MSL	10%	MIL	100%	220 kts
		85%	0%	
15k MSL - 18k MSL	10%	MIL	50%	250 kts
		85%	50%	
10k MSL - 15k MSL	80%	MIL	50%	250 kts
		85%	50%	

Fuzzy MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
3 AGL - 10k MSL	50%	MIL	50%	250 kts
		85%	50%	
1k AGL - 3k AGL	30%	MIL	50%	275 kts
		85%	50%	
100 AGL - 1k AGL	20%	MIL	100%	300 kts
		85%	0%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
3 AGL - 10k MSL	50%	MIL	50%	250 kts
		85%	50%	
1k AGL - 3k AGL	30%	MIL	50%	275 kts
		85%	50%	
100 AGL - 1k AGL	20%	MIL	100%	300 kts
		85%	0%	

Jackal LOW MOA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
500 AGL - 3k AGL/11k MSL	75%	MIL	50%	275 kts
		85%	50%	
100 - 500 AGL	25%	MIL	100%	300 kts
		85%	0%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
100 - 500 AGL	25%	MIL	100%	300 kts
		85%	0%	

Jackal HIGH

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
18k - 23k MSL	10%	MIL	100%	220 kts
		85%	0%	
10k - 18k MSL	40%	MIL	50%	250 kts
		85%	50%	
5k AGL - 10k MSL	30%	MIL	50%	275 kts
		85%	50%	
3k AGL/11k MSL - 5k AGL	20%	MIL	75%	275 kts
		85%	25%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
18k MSL - 23k MSL	10%	MIL	100%	220 kts
		85%	0%	
10k MSL - 18k MSL	35%	MIL	50%	250 kts
		85%	50%	
5k AGL - 10k MSL	20%	MIL	50%	275 kts
		85%	50%	
3k AGL/11k MSL - 5k AGL	10%	MIL	50%	275 kts
		85%	50%	
500 AGL - 3k AGL/11k MSL	25%	MIL	100%	300 kts
		85%	0%	

Alternative 3

500 AGL - 3k AGL/11k MSL	15%	MIL	100%	300 kts
		85%	0%	
100 AGL - 500 AGL	10%	MIL	100%	300 kts
		85%	0%	

Outlaw MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
18k MSL - 23k MSL	10%	MIL	100%	220 kts
		85%	0%	
10k MSL - 18k MSL	40%	MIL	50%	250 kts
		85%	50%	
5k AGL - 10k MSL	30%	MIL	50%	275 kts
		85%	50%	
3k AGL/11k MSL - 5k AGL	20%	MIL	75%	275 kts
		85%	25%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
18k MSL - 23k MSL	10%	MIL	100%	220 kts
		85%	0%	
10k MSL - 18k MSL	35%	MIL	50%	250 kts
		85%	50%	
5k AGL - 10k MSL	20%	MIL	50%	275 kts
		85%	50%	
3k AGL/11k MSL - 5k AGL	10%	MIL	50%	275 kts
		85%	50%	
500 AGL - 3k AGL/11k MSL	25%	MIL	100%	300 kts
		85%	0%	

Morenci MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
10k MSL - 23k MSL	50%	MIL	50%	230 kts
		85%	50%	
5k AGL - 10k MSL	30%	MIL	50%	250 kts
		85%	50%	
3k AGL - 5k AGL	15%	MIL	100%	275 kts
		85%	0%	
1500 AGL - 3k AGL	5%	MIL	100%	300 kts
		85%	0%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
10k MSL - 23k MSL	50%	MIL	50%	230 kts
		85%	50%	
5k AGL - 10k MSL	30%	MIL	50%	250 kts
		85%	50%	
3k AGL - 5k AGL	15%	MIL	100%	275 kts
		85%	0%	
1500 AGL - 3k AGL	5%	MIL	100%	300 kts
		85%	0%	

Tombstone MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
15k MSL - 23k MSL	30%	MIL	75%	230 kts
		85%	25%	
5k AGL - 15k MSL	30%	MIL	50%	250 kts
		85%	50%	
3k AGL - 5k AGL	25%	MIL	50%	275 kts
		85%	50%	
500 AGL - 3k AGL	15%	MIL	100%	300 kts
		85%	0%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
15k MSL - 23k MSL	30%	MIL	75%	230 kts
		85%	25%	
5k AGL - 15k MSL	30%	MIL	50%	250 kts
		85%	50%	
3k AGL - 5k AGL	25%	MIL	50%	275 kts
		85%	50%	
500 AGL - 3k AGL	10%	MIL	100%	300 kts
		85%	0%	
100 AGL - 500 AGL	5%	MIL	100%	300 kts
		85%	0%	

LUKE F-35s

Sells MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
20k - FL500	35%	MAX	25%	0.85M
		MIL	50%	
		85%	25%	
10-20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		85%	40%	
3000 AGL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		85%	50%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
20k - FL500	35%	MAX	25%	0.85M
		MIL	50%	
		85%	25%	
10-20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		85%	40%	
3000 AGL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		85%	50%	

Jackal HIGH

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL290	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
3kAGL/11k MSL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL510	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
500 AGL - 10k MSL	12%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	
100 AGL - 500 AGL	3%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Outlaw MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL290	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
3kAGL/11k MSL - 8k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL510	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
500 AGL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Morenci MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL290	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
1500 AGL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL290	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
1500 AGL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Reserve MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL290	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
5000 AGL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL290	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	50%	MAX	10%	400 kts
		MIL	50%	
		70%	40%	
5000 AGL - 10k MSL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Gladden/Bagdad MOA/ATCAA

Alternative 1 - No Action

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL510	30%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
10k MSL - 20k MSL	60%	MAX	35%	450 kts
		MIL	50%	
		85%	15%	
5000 AGL/7k MSL - 10k MSL	10%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

Alternatives 2 and 4

Altitudes	% of time	Pwr Setting	%	Airspeed
20k MSL - FL510	35%	MAX	25%	0.9 M
		MIL	50%	
		85%	25%	
5k AGL - 20k MSL	50%	MAX	35%	450 kts
		MIL	50%	
		70%	15%	
500 AGL - 5k AGL	15%	MAX	10%	400 kts
		MIL	40%	
		40%	50%	

APPENDIX K
AIR CONFORMITY APPLICABILITY MODEL REPORTS

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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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Fuzzy MOA
State: Arizona
County(s): Santa Cruz; Pima
Regulatory Area(s): Nogales, AZ; Ajo (Pima County), AZ; Tucson, AZ; Rillito, AZ

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Principal/Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

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

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Fuzzy MOA	6.56	3.32	50.63	21.07	5.75	5.17

2026 – Alternatives 2, 3, and 4 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Fuzzy MOA	**6.56**	**3.43**	**51.79**	**21.35**	**6.02**	**5.41**
Net Change from NAA	**0.00**	**0.11**	**1.16**	**0.29**	**0.26**	**0.24**
De Minimis Threshold	**NA**	**100**	**NA**	**NA**	**100**	**NA**
Exceed Threshold?		**No**			**No**	
Exceed 250 ton/year indicator?	**No**		**No**	**No**		**No**

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Lesley Hamilton, Principal/Sr Environmental Scientist DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Jackal Low MOA
State: Arizona
County(s): Graham
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Principal/Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

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

_____ applicable
__X__ not applicable

Total 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., net gain/loss upon action fully implemented) emissions. The ACAM analysis used 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 potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5% of any 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 pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

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

Analysis Summary:

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Jackal Low MOA	27.49	15.47	264.49	82.03	20.21	18.20

2026 – Alternatives 2 & 4 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Jackal Low MOA	**1.00**	**1.99**	**24.64**	**5.59**	**4.10**	**3.69**
Net Change from NAA	**-26.49**	**-13.48**	**-239.84**	**-76.44**	**-16.11**	**-14.51**
Exceed 250 ton/year indicator?	**No**	**No**	**No**	**No**	**No**	**No**

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs.No further air assessment is needed.

Lesley Hamilton, Principal/Sr Environmental Scientist DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Jackal MOA
State: Arizona
County(s): Gila; Graham; Pinal; Navajo
Regulatory Area(s): Hayden AZ; Miami, AZ; Miami (Gila County), AZ; Payson, AZ; Phoenix-Mesa, AZ; West Central Pinal, AZ; Hayden (Pinal County), AZ; Phoenix, AZ; San Manual (Pinal County), AZ; West Pinal, AZ

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Principal/Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

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

Conformity Analysis Summary:

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Jackal MOA	0.00	0.00	0.00	0.00	0.00	0.00

2026 – Alternatives 2 & 4 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Jackal MOA	**4.28**	**5.44**	**86.37**	**17.04**	**7.88**	**7.08**
Net Change from NAA	**4.28**	**5.44**	**86.37**	**17.04**	**7.88**	**7.08**
De Minimis Threshold	**100**	**100**	**NA**	**NA**	**70**	**NA**
Exceed Threshold?	**No**	**No**			**No**	
Exceed 250 ton/year indicator?			**No**	**No**		**No**

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

____ __________________

Lesley Hamilton, Principal/Sr Environmental Scientist DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Jackal MOA
State: Arizona
County(s): Gila; Graham; Navajo; Pinal
Regulatory Area(s): Hayden AZ; Miami, AZ; Miami (Gila County), AZ; Payson, AZ; Phoenix-Mesa, AZ; West Central Pinal, AZ; Hayden (Pinal County), AZ; Phoenix, AZ; San Manual (Pinal County), AZ; West Pinal, AZ

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA/ATCAA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA)..

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs

f. Point of Contact:

Name:	Lesley Hamilton
Title:	Principal/Sr Environmental Scientist
Organization:	Stantec GS
Email:	Lesley.Hamilton@cardno-gs.com
Phone Number:	

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: ____ applicable
__X__ not applicable

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

Conformity Analysis Summary:

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Jackal MOA	0.00	0.00	0.00	0.00	0.00	0.00

2026 – Alternative 3 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Jackal MOA	**5.73**	**11.37**	**150.87**	**31.36**	**21.75**	**19.55**
Net Change from NAA	**5.73**	**11.37**	**150.87**	**31.36**	**21.75**	**19.55**
De Minimis Threshold	**100**	**100**	**NA**	**NA**	**70**	**NA**
Exceed Threshold?	**No**	**No**			**No**	
Exceed 250 ton/year indicator?			**No**	**No**		**No**

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Lesley Hamilton, Principal/Sr Environmental Scientist

DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Morenci MOA
State: Arizona
County(s): Graham; Greenlee
Regulatory Area(s): Morenci (Greenlee County), AZ; NOT IN A REGULATORY AREA

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

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

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Morenci MOA	0.59	0.57	8.92	1.97	0.84	0.75

2026 – Alternatives 2-4 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Morenci MOA	**0.77**	**1.01**	**15.42**	**3.71**	**1.51**	**1.24**
Net Change from NAA	**0.18**	**0.45**	**6.50**	**1.75**	**0.68**	**0.49**
De Minimis Threshold	**NA**	**100**	**NA**	**NA**	**NA**	**NA**
Exceed Threshold?		**No**				
Exceed 250 ton/year indicator?	**No**		**No**	**No**	**No**	**No**

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Lesley Hamilton, Sr Environmental Scientist DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Outlaw MOA
State: Arizona
County(s): Pinal; Gila
Regulatory Area(s): West Central Pinal, AZ; Hayden (Pinal County), AZ; Hayden AZ; Miami, AZ; Phoenix, AZ; Phoenix-Mesa, AZ; San Manual (Pinal County), AZ; West Pinal, AZ; NOT IN A REGULATORY AREA; Miami (Gila County), AZ; Payson, AZ

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:

Name:	Lesley Hamilton
Title:	Sr Environmental Scientist
Organization:	Stantec GS
Email:	Lesley.Hamilton@cardno-gs.com
Phone Number:	

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

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

Conformity Analysis Summary:

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Outlaw MOA	0.00	0.00	0.00	0.00	0.00	0.00

2026 – Alternatives 2 & 4 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Outlaw MOA	**4.27**	**4.25**	**65.12**	**14.09**	**6.53**	**5.87**
Net Change from NAA	**4.27**	**4.25**	**65.12**	**14.09**	**6.53**	**5.87**
De Minimis Threshold	**100**	**100**	**100**	**NA**	**70**	**100**
Exceed Threshold?	**No**	**No**	**No**		**No**	**No**
Exceed 250 ton/year indicator?				**No**		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Lesley Hamilton, Sr Environmental Scientist

DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Outlaw MOA
State: Arizona
County(s): Pinal; Gila
Regulatory Area(s): West Central Pinal, AZ; Hayden (Pinal County), AZ; Hayden AZ; Miami, AZ; Phoenix, AZ; Phoenix-Mesa, AZ; San Manual (Pinal County), AZ; West Pinal, AZ; NOT IN A REGULATORY AREA; Miami (Gila County), AZ; Payson, AZ

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

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

Conformity Analysis Summary:

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Outlaw MOA	0.00	0.00	0.00	0.00	0.00	0.00

2026 – Alternative 3 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Outlaw MOA	**4.36**	**6.22**	**93.94**	**18.27**	**9.84**	**8.85**
Net Change from NAA	**4.36**	**6.22**	**93.94**	**18.27**	**9.84**	**8.85**
De Minimis Threshold	**100**	**100**	**100**	**NA**	**70**	**100**
Exceed Threshold?	**No**	**No**	**No**		**No**	**No**
Exceed 250 ton/year indicator?				**No**		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Lesley Hamilton, Sr Environmental Scientist   DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Tombstone MOA
State: Arizona
County(s): Cochise
Regulatory Area(s): Douglas (Cochise County), AZ; Paul Spur/Douglas (Cochise County), AZ

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

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

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Tombstone MOA	4.73	3.83	63.54	13.73	4.99	4.49

2026 – Alternatives 2 & 4 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Tombstone MOA	**6.29**	**6.54**	**98.11**	**21.06**	**10.39**	**9.34**
Net Change from NAA	**1.56**	**2.71**	**34.57**	**7.33**	**5.40**	**4.85**
De Minimis Threshold	**NA**	**100**	**NA**	**NA**	**100**	**NA**
Exceed Threshold?		**No**			**No**	
Exceed 250 ton/year indicator?	**No**		**No**	**No**		**No**

None of the estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Lesley Hamilton, Sr Environmental Scientist DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Reserve MOA
State: Arizona
County(s): Apache
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

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

_____ applicable
__X__ not applicable

Total 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., net gain/loss upon action fully implemented) emissions. The ACAM analysis used 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 potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5% of any 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 pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

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

Analysis Summary:

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Reserve MOA	0.00	0.00	0.00	0.00	0.00	0.00

2026 – Alternatives 2, 3, 4 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Reserve MOA	**0.00**	**0.47**	**6.66**	**1.12**	**0.83**	**0.75**
Net Change from NAA	**0.00**	**0.47**	**6.66**	**1.12**	**0.83**	**0.75**
Exceed 250 ton/year indicator?	**No**	**No**	**No**	**No**	**No**	**No**

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs. No further air assessment is needed.

Lesley Hamilton, Principal/Sr Environmental Scientist DATE

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 an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Tombstone MOA
State: Arizona
County(s): Cochise
Regulatory Area(s): Douglas (Cochise County), AZ; Paul Spur/Douglas (Cochise County), AZ

b. Action Title: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Under the No Action Alternative (Alternative 1), training would continue in the existing MOAs as charted. Low altitude operations (at or below 3,000 feet AGL) occur in Fuzzy, Jackal Low, Morenci, and Tombstone MOAs.

The Proposed Action (Alternative 2) would fully optimize ten of the existing DAF managed MOAs. The action would implement changes to the times of use, horizontal and vertical dimensions, and attributes of the airspaces. This alternative would broaden the geographic area for low altitude training by lowering the floors of Outlaw, Jackal, Gladden, and Bagdad MOAs. Additionally, the Tombstone A, B, and C MOA components would be combined, the floor lowered, and the northern boundary would increase.

Alternative 3 would include the same proposed modifications as Alternative 2, except there would be no horizontal changes to Tombstone MOA and the floor of the Jackal MOA would be lowered to 100 feet AGL (absorbing the existing Jackal Low MOA).

Alternative 4 would have the same proposed changes as Alternative 2, except that supersonic flight would be authorized down to 10,000 feet AGL (instead of 5,000 feet AGL) in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs. The proposed emissions would be the same as Alternative 2.

f. Point of Contact:
Name: Lesley Hamilton
Title: Sr Environmental Scientist
Organization: Stantec GS
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action 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.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

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

No Action Alternative Criteria Emission Estimates (Baseline)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Tombstone MOA	4.73	3.83	63.54	13.73	4.99	4.49

2026 – Alternative 3 (Steady State)

Airspace Area	VOCs	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Tombstone MOA	**6.24**	**6.06**	**93.33**	**20.07**	**9.20**	**8.27**
Net Change from NAA	**1.51**	**2.23**	**29.79**	**6.35**	**4.21**	**3.79**
De Minimis Threshold	**NA**	**100**	**NA**	**NA**	**100**	**NA**
Exceed Threshold?		**No**			**No**	
Exceed 250 ton/year indicator?	**No**		**No**	**No**		**No**

None of the estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Lesley Hamilton, Sr Environmental Scientist

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

1. General Information

- Action Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: SUA Optimizaiton

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2025

- Action Purpose and Need:
Increase airspace and low altitude

- Action Description:
Increase airspace and low altitude

- Point of Contact
Name: Lesley Hamilton
Title: Consultant
Organization: Stantec
Email: Lesley.Hamilton@cardno-gs.com
Phone Number:

Report generated with ACAM version: 5.0.23a

- Activity List:

	Activity Type	Activity Title
2.	Aircraft	annual sortie activity for GHG emissions - FUZZY MOA Alt 1
3.	Aircraft	annual sortie activity for GHG emissions - FUZZY MOA Alt 1
4.	Aircraft	annual sortie activity for GHG emissions - FUZZY MOA Alt 1
5.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 1
6.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 1
7.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 1
8.	Aircraft	annual sortie activity for GHG emissions - MORENCI MOA Alt 1
9.	Aircraft	annual sortie activity for GHG emissions - MORENCI MOA Alt 1
10.	Aircraft	annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 1
11.	Aircraft	annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 1
12.	Aircraft	annual sortie activity for GHG emissions - GLADBAG MOA Alt 1
13.	Aircraft	annual sortie activity for GHG emissions - JACKAL Alt 1
14.	Aircraft	annual sortie activity for GHG emissions - JACKAL MOA Alt 1
15.	Aircraft	annual sortie activity for GHG emissions - JACKAL MOA Alt 1
16.	Aircraft	Annual sortie activity for GHG emissions - FUZZY MOA Alt 2
17.	Aircraft	annual sortie activity for GHG emissions - FUZZY MOA Alt 2
18.	Aircraft	annual sortie activity for GHG emissions - FUZZY MOA Alt 2
19.	Aircraft	annual sortie activity for GHG emissions - FUZZY MOA Alt 2
20.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 2
21.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 2
22.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 2
23.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 2
24.	Aircraft	annual sortie activity for GHG emissions - GLADBAG MOA Alt 2
25.	Aircraft	annual sortie activity for GHG emissions - GLADBAG MOA Alt 2

26.	Aircraft	annual sortie activity for GHG emissions - GLADBAG MOA Alt 2
27.	Aircraft	annual sortie activity for GHG emissions - MORENCI MOA Alt 2
28.	Aircraft	annual GHG sortie activity for GHG emissions - MORENCI MOA Alt 2
29.	Aircraft	annual sortie activity for GHG emissions - MORENCI MOA Alt 2
30.	Aircraft	annual sortie activity for GHG emissions - JACKAL MOA Alt 2
31.	Aircraft	annual sortie activity for GHGs - JACKAL MOA Alt 2
32.	Aircraft	annual sortie activity for GHG emissions - JACKAL MOA Alt 2
33.	Aircraft	annual sortie activity for GHG emissions - - JACKAL MOA Alt 2
34.	Aircraft	annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 2
35.	Aircraft	annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 2
36.	Aircraft	annual sortie activity for GHG emissions - GLADBAG MOA Alt 1
37.	Aircraft	annual sortie activity for GHG emissions - Fuzzy MOA Alt 1
38.	Aircraft	annual sortie activity for GHG emissions - SELLS MOA Alt 1
39.	Aircraft	annual sortie activity for GHG emissions - GLADBAG Alt 1
40.	Aircraft	annual sortie activity for GHG emissions - MORENCI MOA Alt 1
41.	Aircraft	annual sortie activity for GHG emissions - JACKAL MOA Alt 1

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? Remove

- Activity Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - FUZZY MOA Alt 1

- Activity Description:
A-10 Activity - FUZZY MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-8.533888
SO_x	-3.679730
NO_x	-33.965540
CO	-34.065480

Pollutant	Emissions Per Year (TONs)
PM 10	-11.339732
PM 2.5	-10.194450
Pb	0.000000
NH_3	0.000000

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-0.463233
N_2O	-0.090377

Pollutant	Emissions Per Year (TONs)
CO_2	-11016.630160
CO_2e	-11055.146960

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-8.533888
SO_x	-3.679730
NO_x	-33.965540
CO	-34.065480

Pollutant	Emissions Per Year (TONs)
PM 10	-11.339732
PM 2.5	-10.194450
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	-0.463233
N_2O	-0.090377

Pollutant	Emissions Per Year (TONs)
CO_2	-11016.630160
CO_2e	-11055.146960

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
Number of Engines: 2

- 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

2.3 Flight Operations

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:		100
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
Number of Annual Flight Operation Cycles for all Aircraft:		1900
Number of Annual Trim Test(s) per Aircraft:		0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	24
Takeoff [Military] (mins):	36
Takeoff [After Burn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

2.4 Auxiliary Power Unit (APU)

2.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

2.4.2 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_2O	CO_2	CO_2e

2.4.3 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - FUZZY MOA Alt 1

- Activity Description:
ANGB F-16 activity - FUZZY MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-34.351775
SO_x	-18.709048
NO_x	-343.736684
CO	-97.126283

Pollutant	Emissions Per Year (TONs)
PM 10	-11.554965
PM 2.5	-10.467216
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-23969.281640
N_2O	-23968.194272

Pollutant	Emissions Per Year (TONs)
CO_2	-56095.948835
CO_2e	-56208.276147

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-34.351775
SO_x	-18.709048
NO_x	-343.736684
CO	-97.126283

Pollutant	Emissions Per Year (TONs)
PM 10	-11.554965
PM 2.5	-10.467216
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	-23969.281640
N_2O	-23968.194272

Pollutant	Emissions Per Year (TONs)
CO_2	-56095.948835
CO_2e	-56208.276147

3.2 Aircraft & Engines

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-16C
Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2700
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 14.85
Takeoff [Military] (mins): 37.2
Takeoff [After Burn] (mins): 7.95

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Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

3.4 Auxiliary Power Unit (APU)

3.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

3.4.2 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_2O	CO_2	CO_2e

3.4.3 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

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - FUZZY MOA Alt 1

- Activity Description:
Luke AFB F-16 activity - FUZZY MOA Alt 1

- Activity Start Date

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Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.014908
SO_x	-0.107900
NO_x	-2.436798
CO	-0.922569

Pollutant	Emissions Per Year (TONs)
PM 10	-0.056053
PM 2.5	-0.050594
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-29.085569
N_2O	-29.075617

Pollutant	Emissions Per Year (TONs)
CO_2	-323.139386
CO_2e	-324.167512

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.014908
SO_x	-0.107900
NO_x	-2.436798
CO	-0.922569

Pollutant	Emissions Per Year (TONs)
PM 10	-0.056053
PM 2.5	-0.050594
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	-29.085569
N_2O	-29.075617

Pollutant	Emissions Per Year (TONs)
CO_2	-323.139386
CO_2e	-324.167512

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 10
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 24
Takeoff [Military] (mins): 33
Takeoff [After Burn] (mins): 3

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

4.4 Auxiliary Power Unit (APU)

4.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

4.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

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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_2O	CO_2	CO_2e

4.4.3 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

5. Aircraft

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
SELLS MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 1

- Activity Description:
A-10 Activity - SELLS MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.732288
SO_x	-0.574456
NO_x	-5.511688
CO	-3.360375

Pollutant	Emissions Per Year (TONs)
PM 10	-1.608350
PM 2.5	-1.445569
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-0.072317
N_2O	-0.014109

Pollutant	Emissions Per Year (TONs)
CO_2	-1719.846850
CO_2e	-1725.859850

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.732288
SO_x	-0.574456
NO_x	-5.511688
CO	-3.360375

Pollutant	Emissions Per Year (TONs)
PM 10	-1.608350
PM 2.5	-1.445569
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	-0.072317
N_2O	-0.014109

Pollutant	Emissions Per Year (TONs)
CO_2	-1719.846850
CO_2e	-1725.859850

5.2 Aircraft & Engines

5.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

5.3 Flight Operations

5.3.1 Flight Operations Assumptions

- Flight Operations

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
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Number of Aircraft:		10
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
Number of Annual Flight Operation Cycles for all Aircraft:		250
Number of Annual Trim Test(s) per Aircraft:		0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	15
Takeoff [Military] (mins):	45
Takeoff [After Burn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

5.4 Auxiliary Power Unit (APU)

5.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

5.4.2 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_2O	CO_2	CO_2e

5.4.3 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

6. Aircraft

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
SELLS MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 1

- Activity Description:
ANGB F-16 activity - SELLS MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-34.709321
SO_x	-19.626665
NO_x	-303.557863
CO	-131.422246

Pollutant	Emissions Per Year (TONs)
PM 10	-10.710388
PM 2.5	-9.729245
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-33767.197257
N_2O	-33766.347373

Pollutant	Emissions Per Year (TONs)
CO_2	-58877.311689
CO_2e	-58965.106406

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-34.709321
SO_x	-19.626665
NO_x	-303.557863
CO	-131.422246

Pollutant	Emissions Per Year (TONs)
PM 10	-10.710388
PM 2.5	-9.729245
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	-33767.197257
N_2O	-33766.347373

Pollutant	Emissions Per Year (TONs)
CO_2	-58877.311689
CO_2e	-58965.106406

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C

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Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2400
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 17.1
Takeoff [Military] (mins): 30.3
Takeoff [After Burn] (mins): 12.6

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12

Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

6.4 Auxiliary Power Unit (APU)

6.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

6.4.2 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_2O	CO_2	CO_2e

6.4.3 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

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
SELLS MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 1

- Activity Description:
Luke AFB F-16 activity - SELLS MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A

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End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-3.692218
SO_x	-7.610485
NO_x	-155.174179
CO	-210.220696

Pollutant	Emissions Per Year (TONs)
PM 10	-10.626753
PM 2.5	-9.562272
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-9344.694346
N_2O	-9344.238347

Pollutant	Emissions Per Year (TONs)
CO_2	-22817.350538
CO_2e	-22864.456179

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-3.692218
SO_x	-7.610485
NO_x	-155.174179
CO	-210.220696

Pollutant	Emissions Per Year (TONs)
PM 10	-10.626753
PM 2.5	-9.562272
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	-9344.694346
N_2O	-9344.238347

Pollutant	Emissions Per Year (TONs)
CO_2	-22817.350538
CO_2e	-22864.456179

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
- **Aircraft Designation:** F-16C
- **Engine Model:** F110-GE-100
- **Primary Function:** Combat
- **Aircraft has After burn:** 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

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- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 1200
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 9.31
Takeoff [Military] (mins): 31.02
Takeoff [After Burn] (mins): 16.07

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

7.4 Auxiliary Power Unit (APU)

7.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

7.4.2 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_2O	CO_2	CO_2e

7.4.3 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

8. Aircraft

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
MORENCI MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - MORENCI MOA Alt 1

- Activity Description:
A-10 activity - MORENCI MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-3.144064
SO_x	-1.355690
NO_x	-12.513620
CO	-12.550440

Pollutant	Emissions Per Year (TONs)
PM 10	-4.177796
PM 2.5	-3.755850
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-0.170665
N_2O	-0.033297

Pollutant	Emissions Per Year (TONs)
CO_2	-4058.758480
CO_2e	-4072.948880

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-3.144064
SO_x	-1.355690
NO_x	-12.513620

Pollutant	Emissions Per Year (TONs)
PM 10	-4.177796
PM 2.5	-3.755850
Pb	0.000000

CO	-12.550440		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	-0.170665		CO_2	-4058.758480
N_2O	-0.033297		CO_2e	-4072.948880

8.2 Aircraft & Engines

8.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
Number of Engines: 2

- 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

8.3 Flight Operations

8.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 700
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	24
Takeoff [Military] (mins):	36
Takeoff [After Burn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

8.4 Auxiliary Power Unit (APU)

8.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

8.4.2 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_2O	CO_2	CO_2e

8.4.3 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

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
MORENCI MOA

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Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - MORENCI MOA Alt 1

- Activity Description:
ANGB F-16 activity - MORENCI MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-27.145375
SO_x	-13.920836
NO_x	-281.150816
CO	-55.244916

Pollutant	Emissions Per Year (TONs)
PM 10	-9.198616
PM 2.5	-8.317300
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-12864.505416
N_2O	-12863.528698

Pollutant	Emissions Per Year (TONs)
CO_2	-41721.977723
CO_2e	-41822.874659

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-27.145375
SO_x	-13.920836
NO_x	-281.150816
CO	-55.244916

Pollutant	Emissions Per Year (TONs)
PM 10	-9.198616
PM 2.5	-8.317300
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	-12864.505416
N_2O	-12863.528698

Pollutant	Emissions Per Year (TONs)
CO_2	-41721.977723
CO_2e	-41822.874659

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

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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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2400
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 21.45
Takeoff [Military] (mins): 33.75
Takeoff [After Burn] (mins): 4.8

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

9.4 Auxiliary Power Unit (APU)

9.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

9.4.2 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_2O	CO_2	CO_2e

9.4.3 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

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
TOMBSTONE MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 1

- Activity Description:
A-10 activity - TOMBSTONE MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-9.529752
SO_x	-4.936980

Pollutant	Emissions Per Year (TONs)
PM 10	-14.695968
PM 2.5	-13.210620

NO_x	-46.239960		Pb	0.000000
CO	-39.439920		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	-0.621506		CO_2	-14780.672160
N_2O	-0.121256		CO_2e	-14832.348960

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
VOC	-9.529752		PM 10	-14.695968
SO_x	-4.936980		PM 2.5	-13.210620
NO_x	-46.239960		Pb	0.000000
CO	-39.439920		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	-0.621506		CO_2	-14780.672160
N_2O	-0.121256		CO_2e	-14832.348960

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64

After Burn	0.00	0.13	0.03	3203.44	3214.64

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2400
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 21
Takeoff [Military] (mins): 39
Takeoff [After Burn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

10.4 Auxiliary Power Unit (APU)

10.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

10.4.2 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_2O	CO_2	CO_2e

10.4.3 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

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
TOMBSTONE MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 1

- Activity Description:
ANGB F-16 activity - TOMBSTONE MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-9.927682
SO_x	-5.239428
NO_x	-107.324207
CO	-21.277173

Pollutant	Emissions Per Year (TONs)
PM 10	-3.508268
PM 2.5	-3.172587
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-4983.301512
N_2O	-4982.938672

Pollutant	Emissions Per Year (TONs)
CO_2	-15703.523270
CO_2e	-15741.005331

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-9.927682
SO_x	-5.239428
NO_x	-107.324207
CO	-21.277173

Pollutant	Emissions Per Year (TONs)
PM 10	-3.508268
PM 2.5	-3.172587
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	-4983.301512

Pollutant	Emissions Per Year (TONs)
CO_2	-15703.523270

N_2O	-4982.938672		CO_2e	-15741.005331

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 0
Climb Out [Intermediate] (mins): 14.7
Takeoff [Military] (mins): 40.05

Takeoff [After Burn] (mins): 5.25

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

11.4 Auxiliary Power Unit (APU)

11.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

11.4.2 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_2O	CO_2	CO_2e

11.4.3 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

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
GLADBAG MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - GLADBAG MOA Alt 1

- Activity Description:
Luke F-16 activity - GLADBAG MOA Alt 1

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-5.092062
SO_x	-9.052322
NO_x	-176.055224
CO	-288.386620

Pollutant	Emissions Per Year (TONs)
PM 10	-14.550924
PM 2.5	-13.088448
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-13039.925268
N_2O	-13039.447800

Pollutant	Emissions Per Year (TONs)
CO_2	-27146.897413
CO_2e	-27196.220869

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-5.092062
SO_x	-9.052322
NO_x	-176.055224
CO	-288.386620

Pollutant	Emissions Per Year (TONs)
PM 10	-14.550924
PM 2.5	-13.088448
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	-13039.925268
N_2O	-13039.447800

Pollutant	Emissions Per Year (TONs)
CO_2	-27146.897413
CO_2e	-27196.220869

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 1300
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 9.9
Takeoff [Military] (mins): 29.4
Takeoff [After Burn] (mins): 20.7

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

12.4 Auxiliary Power Unit (APU)

12.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

12.4.2 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_2O	CO_2	CO_2e

12.4.3 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

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - JACKAL Alt 1

- Activity Description:
A-10 Activity - JACKAL Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-7.635584
SO_x	-3.292390
NO_x	-30.390220
CO	-30.479640

Pollutant	Emissions Per Year (TONs)
PM 10	-10.146076
PM 2.5	-9.121350
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)

Pollutant	Emissions Per Year (TONs)

CH_4	-0.414472		CO_2	-9856.984880
N_2O	-0.080864		CO_2e	-9891.447280

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
VOC	-7.635584		PM 10	-10.146076
SO_x	-3.292390		PM 2.5	-9.121350
NO_x	-30.390220		Pb	0.000000
CO	-30.479640		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	-0.414472		CO_2	-9856.984880
N_2O	-0.080864		CO_2e	-9891.447280

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Flight Operations

Number of Aircraft:	100
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	1700
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	24
Takeoff [Military] (mins):	36
Takeoff [After Burn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

13.4 Auxiliary Power Unit (APU)

13.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

13.4.2 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_2O	CO_2	CO_2e

13.4.3 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - JACKAL MOA Alt 1

- Activity Description:
ANGB F-16 activity - JACKAL MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-31.173522
SO_x	-15.640768
NO_x	-305.278254
CO	-63.969992

Pollutant	Emissions Per Year (TONs)
PM 10	-10.047383
PM 2.5	-9.086225
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-15008.514093
N_2O	-15007.435406

Pollutant	Emissions Per Year (TONs)
CO_2	-46878.698238
CO_2e	-46990.128786

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-31.173522
SO_x	-15.640768
NO_x	-305.278254
CO	-63.969992

Pollutant	Emissions Per Year (TONs)
PM 10	-10.047383
PM 2.5	-9.086225
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	-15008.514093
N_2O	-15007.435406

Pollutant	Emissions Per Year (TONs)
CO_2	-46878.698238
CO_2e	-46990.128786

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2800
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 27.6
Takeoff [Military] (mins): 27.6
Takeoff [After Burn] (mins): 4.8

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

14.4 Auxiliary Power Unit (APU)

14.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

14.4.2 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_2O	CO_2	CO_2e

14.4.3 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

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - JACKAL MOA Alt 1

- Activity Description:
Luke AFB F-16 activity Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date

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

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.065533
SO_x	-0.137531
NO_x	-2.874605
CO	-3.735933

Pollutant	Emissions Per Year (TONs)
PM 10	-0.186860
PM 2.5	-0.168178
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-165.727633
N_2O	-165.719287

Pollutant	Emissions Per Year (TONs)
CO_2	-412.325763
CO_2e	-413.187966

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.065533
SO_x	-0.137531
NO_x	-2.874605
CO	-3.735933

Pollutant	Emissions Per Year (TONs)
PM 10	-0.186860
PM 2.5	-0.168178
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	-165.727633
N_2O	-165.719287

Pollutant	Emissions Per Year (TONs)
CO_2	-412.325763
CO_2e	-413.187966

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13

After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 10
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 6.3
Takeoff [Military] (mins): 36.6
Takeoff [After Burn] (mins): 17.1

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

15.4 Auxiliary Power Unit (APU)

15.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

15.4.2 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_2O	CO_2	CO_2e

15.4.3 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

16. Aircraft

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Annual sortie activity for GHG emissions - FUZZY MOA Alt 2

- Activity Description:
A-10 activity - FUZZY MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	10.330496
SO_x	4.454410
NO_x	41.116180
CO	41.237160

Pollutant	Emissions Per Year (TONs)
PM 10	13.727044
PM 2.5	12.340650
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.560756
N_2O	0.109404

Pollutant	Emissions Per Year (TONs)
CO_2	13335.920720
CO_2e	13382.546320

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	10.330496

Pollutant	Emissions Per Year (TONs)
PM 10	13.727044

SO_x	4.454410		PM 2.5	12.340650
NO_x	41.116180		Pb	0.000000
CO	41.237160		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	0.560756		CO_2	13335.920720
N_2O	0.109404		CO_2e	13382.546320

16.2 Aircraft & Engines

16.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

16.3 Flight Operations

16.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2300
Number of Annual Trim Test(s) per Aircraft: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	24
Takeoff [Military] (mins):	36
Takeoff [After Burn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds

EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

16.4 Auxiliary Power Unit (APU)

16.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

16.4.2 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_2O	CO_2	CO_2e

16.4.3 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

17. Aircraft

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Activity Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - FUZZY MOA Alt 2

- Activity Description:
ANGB F-16 activity - FUZZY MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	53.436094
SO_x	29.102964
NO_x	534.701509
CO	151.085329

Pollutant	Emissions Per Year (TONs)
PM 10	17.974389
PM 2.5	16.282337
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	37285.549218
N_2O	37283.857756

Pollutant	Emissions Per Year (TONs)
CO_2	87260.364855
CO_2e	87435.096228

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	53.436094
SO_x	29.102964
NO_x	534.701509
CO	151.085329

Pollutant	Emissions Per Year (TONs)
PM 10	17.974389
PM 2.5	16.282337
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	37285.549218
N_2O	37283.857756

Pollutant	Emissions Per Year (TONs)
CO_2	87260.364855
CO_2e	87435.096228

17.2 Aircraft & Engines

17.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

17.3 Flight Operations

17.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 4200
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 14.85
Takeoff [Military] (mins): 37.2
Takeoff [After Burn] (mins): 7.95

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
AE_{FOC} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

17.4 Auxiliary Power Unit (APU)

17.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

17.4.2 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_2O	CO_2	CO_2e

17.4.3 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

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - FUZZY MOA Alt 2

- Activity Description:
Luke AFB F-16 activity - FUZZY MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.014908
SO_x	0.107900
NO_x	2.436798
CO	0.922569

Pollutant	Emissions Per Year (TONs)
PM 10	0.056053
PM 2.5	0.050594
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	29.085569
N_2O	29.075617

Pollutant	Emissions Per Year (TONs)
CO_2	323.139386
CO_2e	324.167512

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.014908
SO_x	0.107900
NO_x	2.436798
CO	0.922569

Pollutant	Emissions Per Year (TONs)
PM 10	0.056053
PM 2.5	0.050594
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	29.085569
N_2O	29.075617

Pollutant	Emissions Per Year (TONs)
CO_2	323.139386
CO_2e	324.167512

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64

Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 10
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 24
Takeoff [Military] (mins): 33
Takeoff [After Burn] (mins): 3

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

18.4 Auxiliary Power Unit (APU)

18.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

18.4.2 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_2O	CO_2	CO_2e

18.4.3 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

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
FUZZY MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - FUZZY MOA Alt 2

- Activity Description:
F-35 activity - FUZZY MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.024589
SO_x	9.470919
NO_x	167.451466
CO	27.320998

Pollutant	Emissions Per Year (TONs)
PM 10	10.579842
PM 2.5	9.517516
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	7905.199925
N_2O	7904.506854

Pollutant	Emissions Per Year (TONs)
CO_2	28382.231755
CO_2e	28453.827415

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.024589
SO_x	9.470919
NO_x	167.451466
CO	27.320998

Pollutant	Emissions Per Year (TONs)
PM 10	10.579842
PM 2.5	9.517516
Pb	0.000000
NH_3	0.000000

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- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH_4	7905.199925
N_2O	7904.506854

Pollutant	Emissions Per Year (TONs)
CO_2	28382.231755
CO_2e	28453.827415

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb 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: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 0
Climb Out [Intermediate] (mins): 21.75
Takeoff [Military] (mins): 29.1
Takeoff [After Burn] (mins): 9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12

Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

19.4 Auxiliary Power Unit (APU)

19.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

19.4.2 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_2O	CO_2	CO_2e

19.4.3 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

20. Aircraft

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
SELLS MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 2

- Activity Description:
A-10 activity - SELLS MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A

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End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.025203
SO_x	0.804239
NO_x	7.716363
CO	4.704525

Pollutant	Emissions Per Year (TONs)
PM 10	2.251690
PM 2.5	2.023796
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.101244
N_2O	0.019753

Pollutant	Emissions Per Year (TONs)
CO_2	2407.785590
CO_2e	2416.203790

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.025203
SO_x	0.804239
NO_x	7.716363
CO	4.704525

Pollutant	Emissions Per Year (TONs)
PM 10	2.251690
PM 2.5	2.023796
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	0.101244
N_2O	0.019753

Pollutant	Emissions Per Year (TONs)
CO_2	2407.785590
CO_2e	2416.203790

20.2 Aircraft & Engines

20.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

20.3 Flight Operations

20.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 10
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 350
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 15
Takeoff [Military] (mins): 45
Takeoff [After Burn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

20.4 Auxiliary Power Unit (APU)

20.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

20.4.2 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_2O	CO_2	CO_2e

20.4.3 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

21. Aircraft

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
SELLS MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 2

- Activity Description:
ANGB F-16 - SELLS MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	44.832873
SO_x	25.351110
NO_x	392.095573
CO	169.753734

Pollutant	Emissions Per Year (TONs)
PM 10	13.834251
PM 2.5	12.566942
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	43615.963124
N_2O	43614.865357

Pollutant	Emissions Per Year (TONs)
CO_2	76049.860932
CO_2e	76163.262441

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	44.832873
SO_x	25.351110
NO_x	392.095573

Pollutant	Emissions Per Year (TONs)
PM 10	13.834251
PM 2.5	12.566942
Pb	0.000000

CO	169.753734		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	43615.963124		CO_2	76049.860932
N_2O	43614.865357		CO_2e	76163.262441

21.2 Aircraft & Engines

21.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

21.3 Flight Operations

21.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 3100
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	17.1
Takeoff [Military] (mins):	30.3
Takeoff [After Burn] (mins):	12.6

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

21.4 Auxiliary Power Unit (APU)

21.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

21.4.2 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_2O	CO_2	CO_2e

21.4.3 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

22. Aircraft

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
SELLS MOA

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Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 2

- Activity Description:
Luke AFB F-16 - SELLS MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	4.307588
SO_x	8.878899
NO_x	181.036542
CO	245.257478

Pollutant	Emissions Per Year (TONs)
PM 10	12.397878
PM 2.5	11.155984
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	10902.143404
N_2O	10901.611405

Pollutant	Emissions Per Year (TONs)
CO_2	26620.242295
CO_2e	26675.198876

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	4.307588
SO_x	8.878899
NO_x	181.036542
CO	245.257478

Pollutant	Emissions Per Year (TONs)
PM 10	12.397878
PM 2.5	11.155984
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	10902.143404
N_2O	10901.611405

Pollutant	Emissions Per Year (TONs)
CO_2	26620.242295
CO_2e	26675.198876

22.2 Aircraft & Engines

22.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

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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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

22.3 Flight Operations

22.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 1400
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 9.31
Takeoff [Military] (mins): 31.02
Takeoff [After Burn] (mins): 16.07

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

22.4 Auxiliary Power Unit (APU)

22.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

22.4.2 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_2O	CO_2	CO_2e

22.4.3 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

23. Aircraft

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
SELLS MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 2

- Activity Description:
F-35 activity - SELLS MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.335562
SO_x	129.250190

Pollutant	Emissions Per Year (TONs)
PM 10	144.383723
PM 2.5	129.886106

NO_x	2285.220006	Pb	0.000000
CO	372.851267	NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
CH_4	107882.728393	CO_2	387333.986306
N_2O	107873.270005	CO_2e	388311.056487

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	0.335562	PM 10	144.383723
SO_x	129.250190	PM 2.5	129.886106
NO_x	2285.220006	Pb	0.000000
CO	372.851267	NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
CH_4	107882.728393	CO_2	387333.986306
N_2O	107873.270005	CO_2e	388311.056487

23.2 Aircraft & Engines

23.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb 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: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 11600
Number of Annual Trim Test(s) per Aircraft: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	21.75
Takeoff [Military] (mins):	29.1
Takeoff [After Burn] (mins):	9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)

NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

23.4 Auxiliary Power Unit (APU)

23.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

23.4.2 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_2O	CO_2	CO_2e

23.4.3 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. Aircraft

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

GLADBAG MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - GLADBAG MOA Alt 2

- Activity Description:
A-10 activity - GLADNBAG MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.079415
SO_x	0.041142
NO_x	0.385333
CO	0.328666

Pollutant	Emissions Per Year (TONs)
PM 10	0.122466
PM 2.5	0.110089
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.005179
N_2O	0.001010

Pollutant	Emissions Per Year (TONs)
CO_2	123.172268
CO_2e	123.602908

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.079415
SO_x	0.041142
NO_x	0.385333
CO	0.328666

Pollutant	Emissions Per Year (TONs)
PM 10	0.122466
PM 2.5	0.110089
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	0.005179
N_2O	0.001010

Pollutant	Emissions Per Year (TONs)
CO_2	123.172268
CO_2e	123.602908

24.2 Aircraft & Engines

24.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
Number of Engines: 2

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

- 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

24.3 Flight Operations

24.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 10
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 21
Takeoff [Military] (mins): 39
Takeoff [After Burn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

24.4 Auxiliary Power Unit (APU)

24.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

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

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

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

25. Aircraft

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
GLADBAG MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - GLADBAG MOA Alt 2

- Activity Description:
Luke AFB F-16 activity - GLADBAG MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)

VOC	5.307081		PM 10	15.276679
SO_x	10.352498		PM 2.5	13.743785
NO_x	206.326678		Pb	0.000000
CO	301.491184		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	13490.704727		CO_2	31041.025057
N_2O	13490.110714		CO_2e	31102.387796

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
VOC	5.307081		PM 10	15.276679
SO_x	10.352498		PM 2.5	13.743785
NO_x	206.326678		Pb	0.000000
CO	301.491184		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	13490.704727		CO_2	31041.025057
N_2O	13490.110714		CO_2e	31102.387796

25.2 Aircraft & Engines

25.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64

Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

25.3 Flight Operations

25.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 1600
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 10.5
Takeoff [Military] (mins): 29.4
Takeoff [After Burn] (mins): 17.4

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

25.4 Auxiliary Power Unit (APU)

25.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

25.4.2 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_2O	CO_2	CO_2e

25.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

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

26. Aircraft

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
GLADBAG MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - GLADBAG MOA Alt 2

- Activity Description:
F-35 activity - GLADBAG MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	23.290325
SO_x	47.918142
NO_x	951.886570
CO	1325.025760

Pollutant	Emissions Per Year (TONs)
PM 10	67.876306
PM 2.5	61.064785
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	58898.607816
N_2O	58895.738760

Pollutant	Emissions Per Year (TONs)
CO_2	143665.840476
CO_2e	143962.219658

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	23.290325
SO_x	47.918142
NO_x	951.886570
CO	1325.025760

Pollutant	Emissions Per Year (TONs)
PM 10	67.876306
PM 2.5	61.064785
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
GHGs Only

Pollutant	Emissions Per Year (TONs)
CH_4	58898.607816
N_2O	58895.738760

Pollutant	Emissions Per Year (TONs)
CO_2	143665.840476
CO_2e	143962.219658

26.2 Aircraft & Engines

26.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

26.3 Flight Operations

26.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 7300
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0

Climb Out [Intermediate] (mins): 14.25
Takeoff [Military] (mins): 29.1
Takeoff [After Burn] (mins): 16.65

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

26.4 Auxiliary Power Unit (APU)

26.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

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_2O	CO_2	CO_2e

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? Add

- Activity Location
MORENCI MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - MORENCI MOA Alt 2

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- Activity Description:
A-10 activity - MORENCI MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	3.817792
SO_x	1.646195
NO_x	15.195110
CO	15.239820

Pollutant	Emissions Per Year (TONs)
PM 10	5.073038
PM 2.5	4.560675
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.207236
N_2O	0.040432

Pollutant	Emissions Per Year (TONs)
CO_2	4928.492440
CO_2e	4945.723640

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	3.817792
SO_x	1.646195
NO_x	15.195110
CO	15.239820

Pollutant	Emissions Per Year (TONs)
PM 10	5.073038
PM 2.5	4.560675
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	0.207236
N_2O	0.040432

Pollutant	Emissions Per Year (TONs)
CO_2	4928.492440
CO_2e	4945.723640

27.2 Aircraft & Engines

27.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
Number of Engines: 2

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

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27.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

27.3 Flight Operations

27.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 0
Climb Out [Intermediate] (mins): 24
Takeoff [Military] (mins): 36
Takeoff [After Burn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

27.4 Auxiliary Power Unit (APU)

27.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

27.4.2 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_2O	CO_2	CO_2e

27.4.3 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. Aircraft

28.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
MORENCI MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual GHG sortie activity for GHG emissions - MORENCI MOA Alt 2

- Activity Description:
ANGB F-16 activity - MORENCI MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	32.800661
SO_x	16.821010
NO_x	339.723903
CO	66.754273

Pollutant	Emissions Per Year (TONs)
PM 10	11.114994
PM 2.5	10.050070
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

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Pollutant	Emissions Per Year (TONs)
CH_4	15544.610711
N_2O	15543.430510

Pollutant	Emissions Per Year (TONs)
CO_2	50414.056416
CO_2e	50535.973547

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	32.800661
SO_x	16.821010
NO_x	339.723903
CO	66.754273

Pollutant	Emissions Per Year (TONs)
PM 10	11.114994
PM 2.5	10.050070
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	15544.610711
N_2O	15543.430510

Pollutant	Emissions Per Year (TONs)
CO_2	50414.056416
CO_2e	50535.973547

28.2 Aircraft & Engines

28.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-16C
Engine Model: F100-PW-220
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	2084.00	7.94	1.07	4.61	35.32	0.67	0.60
Approach	3837.00	5.12	1.07	12.50	1.92	0.70	0.63
Intermediate	5770.00	2.89	1.07	22.20	0.86	0.70	0.63
Military	9679.00	2.08	1.07	29.60	0.86	0.91	0.82
After Burn	41682.00	1.60	1.07	8.20	11.87	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	2084.00	0.13	0.03	3203.44	3214.64
Approach	3837.00	0.13	0.03	3203.44	3214.64
Intermediate	5770.00	0.13	0.03	3203.44	3214.64
Military	9679.00	0.13	0.03	3203.44	3214.64
After Burn	41682.00	0.13	0.03	3203.44	3214.64

28.3 Flight Operations

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28.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:		100
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
Number of Annual Flight Operation Cycles for all Aircraft:		2900
Number of Annual Trim Test(s) per Aircraft:		0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	21.45
Takeoff [Military] (mins):	33.75
Takeoff [After Burn] (mins):	4.8

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

28.4 Auxiliary Power Unit (APU)

28.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

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

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

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

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29. Aircraft

29.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
MORENCI MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - MORENCI MOA Alt 2

- Activity Description:
Luke AFB F-35 activity - MORENCI MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.004339
SO_x	1.671339
NO_x	29.550259
CO	4.821353

Pollutant	Emissions Per Year (TONs)
PM 10	1.867031
PM 2.5	1.679562
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	1395.035281
N_2O	1394.912974

Pollutant	Emissions Per Year (TONs)
CO_2	5008.629133
CO_2e	5021.263661

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.004339
SO_x	1.671339
NO_x	29.550259
CO	4.821353

Pollutant	Emissions Per Year (TONs)
PM 10	1.867031
PM 2.5	1.679562
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	1395.035281
N_2O	1394.912974

Pollutant	Emissions Per Year (TONs)
CO_2	5008.629133
CO_2e	5021.263661

29.2 Aircraft & Engines

29.2.1 Aircraft & Engines Assumptions

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- Aircraft & Engine

Aircraft Designation:	F-35A
Engine Model:	F135-PW-100
Primary Function:	Combat
Aircraft has After burn:	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/1000lb 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:		10
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
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
Climb Out [Intermediate] (mins):	21.75
Takeoff [Military] (mins):	29.1
Takeoff [After Burn] (mins):	9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

29.4 Auxiliary Power Unit (APU)

29.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

29.4.2 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_2O	CO_2	CO_2e

29.4.3 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. Aircraft

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - JACKAL MOA Alt 2

- Activity Description:
A-10 activity - - JACKAL MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	7.791704
SO_x	4.446251
NO_x	41.919518
CO	32.939235

Pollutant	Emissions Per Year (TONs)
PM 10	13.021764
PM 2.5	11.705164
Pb	0.000000
NH_3	0.000000

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- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.559729
N_2O	0.109203

Pollutant	Emissions Per Year (TONs)
CO_2	13311.494490
CO_2e	13358.034690

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	7.791704
SO_x	4.446251
NO_x	41.919518
CO	32.939235

Pollutant	Emissions Per Year (TONs)
PM 10	13.021764
PM 2.5	11.705164
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	0.559729
N_2O	0.109203

Pollutant	Emissions Per Year (TONs)
CO_2	13311.494490
CO_2e	13358.034690

30.2 Aircraft & Engines

30.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
- **Aircraft Designation:** A-10C
- **Engine Model:** TF34-GE-100
- **Primary Function:** Combat
- **Aircraft has After burn:** No
- **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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

30.3 Flight Operations

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
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30.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	100
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft:	2100
Number of Annual Trim Test(s) per Aircraft:	0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	19.5
Takeoff [Military] (mins):	40.5
Takeoff [After Burn] (mins):	0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

30.4 Auxiliary Power Unit (APU)

30.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

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_2O	CO_2	CO_2e

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

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31. Aircraft

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHGs - JACKAL MOA Alt 2

- Activity Description:
ANGB F-16 activity - JACKAL MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	5.044066
SO_x	18.690753
NO_x	416.251255
CO	64.631285

Pollutant	Emissions Per Year (TONs)
PM 10	36.648855
PM 2.5	32.926786
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	18091.180299
N_2O	18089.896526

Pollutant	Emissions Per Year (TONs)
CO_2	56020.692704
CO_2e	56153.309018

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	5.044066
SO_x	18.690753
NO_x	416.251255
CO	64.631285

Pollutant	Emissions Per Year (TONs)
PM 10	36.648855
PM 2.5	32.926786
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	18091.180299
N_2O	18089.896526

Pollutant	Emissions Per Year (TONs)
CO_2	56020.692704
CO_2e	56153.309018

31.2 Aircraft & Engines

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31.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F100-PW-200
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1006.00	2.05	1.07	6.21	24.06	2.47	2.22
Approach	3251.00	0.05	1.07	17.93	1.22	2.37	2.13
Intermediate	5651.00	0.07	1.07	26.55	0.38	1.58	1.42
Military	8888.00	0.11	1.07	34.32	0.56	1.66	1.49
After Burn	40123.00	0.69	1.07	6.63	10.42	3.07	2.76

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1006.00	0.13	0.03	3203.44	3214.64
Approach	3251.00	0.13	0.03	3203.44	3214.64
Intermediate	5651.00	0.13	0.03	3203.44	3214.64
Military	8888.00	0.13	0.03	3203.44	3214.64
After Burn	40123.00	0.13	0.03	3203.44	3214.64

31.3 Flight Operations

31.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 3400
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 22.05
Takeoff [Military] (mins): 33
Takeoff [After Burn] (mins): 4.95

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Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

31.4 Auxiliary Power Unit (APU)

31.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

31.4.2 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_2O	CO_2	CO_2e

31.4.3 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

32. Aircraft

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - JACKAL MOA Alt 2

- Activity Description:
Luke AFB F-16 - JACKAL MOA Alt 2

- Activity Start Date

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Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.098415
SO_x	0.167631
NO_x	3.274983
CO	5.568394

Pollutant	Emissions Per Year (TONs)
PM 10	0.278457
PM 2.5	0.250476
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	252.947380
N_2O	252.938926

Pollutant	Emissions Per Year (TONs)
CO_2	502.746093
CO_2e	503.619486

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.098415
SO_x	0.167631
NO_x	3.274983
CO	5.568394

Pollutant	Emissions Per Year (TONs)
PM 10	0.278457
PM 2.5	0.250476
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	252.947380
N_2O	252.938926

Pollutant	Emissions Per Year (TONs)
CO_2	502.746093
CO_2e	503.619486

32.2 Aircraft & Engines

32.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F110-GE-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

Idle	1111.00	0.22	1.07	3.77	24.11	2.60	2.34
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	1.23
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.52
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.13
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	3.01

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1111.00	0.13	0.03	3203.44	3214.64
Approach	5080.00	0.13	0.03	3203.44	3214.64
Intermediate	7332.00	0.13	0.03	3203.44	3214.64
Military	11358.00	0.13	0.03	3203.44	3214.64
After Burn	18088.00	0.13	0.03	3203.44	3214.64

32.3 Flight Operations

32.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 10
Flight Operation Cycle Type: LTO (Landing and Takeoff)
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): 7.35
Takeoff [Military] (mins): 36.45
Takeoff [After Burn] (mins): 26.1

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

32.4 Auxiliary Power Unit (APU)

32.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

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

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

32.4.3 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

33. Aircraft

33.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - - JACKAL MOA Alt 2

- Activity Description:
F-35 activity - JACKAL MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.021696
SO_x	8.356693
NO_x	147.751294
CO	24.106763

Pollutant	Emissions Per Year (TONs)
PM 10	9.335154
PM 2.5	8.397809
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	6975.176405
N_2O	6974.564871

Pollutant	Emissions Per Year (TONs)
CO_2	25043.145666
CO_2e	25106.318307

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- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.021696
SO_x	8.356693
NO_x	147.751294
CO	24.106763

Pollutant	Emissions Per Year (TONs)
PM 10	9.335154
PM 2.5	8.397809
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	6975.176405
N_2O	6974.564871

Pollutant	Emissions Per Year (TONs)
CO_2	25043.145666
CO_2e	25106.318307

33.2 Aircraft & Engines

33.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb 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: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 750
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 21.75
Takeoff [Military] (mins): 29.1

Takeoff [After Burn] (mins): 9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

33.4 Auxiliary Power Unit (APU)

33.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

33.4.2 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_2O	CO_2	CO_2e

33.4.3 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. Aircraft

34.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
TOMBSTONE MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 2

- Activity Description:
A-10 activity - TOMBSTONE MOA Alt 2

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- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	26.206818
SO_x	13.576695
NO_x	127.159890
CO	108.459780

Pollutant	Emissions Per Year (TONs)
PM 10	40.413912
PM 2.5	36.329205
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	1.709141
N_2O	0.333454

Pollutant	Emissions Per Year (TONs)
CO_2	40646.848440
CO_2e	40788.959640

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	26.206818
SO_x	13.576695
NO_x	127.159890
CO	108.459780

Pollutant	Emissions Per Year (TONs)
PM 10	40.413912
PM 2.5	36.329205
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	1.709141
N_2O	0.333454

Pollutant	Emissions Per Year (TONs)
CO_2	40646.848440
CO_2e	40788.959640

34.2 Aircraft & Engines

34.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-10C
Engine Model: TF34-GE-100
Primary Function: Combat
Aircraft has After burn: No
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)

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- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

34.3 Flight Operations

34.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 6600
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 21
Takeoff [Military] (mins): 39
Takeoff [After Burn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

34.4 Auxiliary Power Unit (APU)

34.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

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_2O	CO_2	CO_2e

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

35. Aircraft

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
TOMBSTONE MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - TOMBSTONE MOA Alt 2

- Activity Description:
ANGB F-16 activity - TOMBSTONE MOA Alt 2

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.747106
SO_x	6.376212
NO_x	145.029869
CO	22.275147

Pollutant	Emissions Per Year (TONs)
PM 10	12.558932
PM 2.5	11.282660
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)

Pollutant	Emissions Per Year (TONs)

CH_4	6219.576015		CO_2	19111.211727
N_2O	6219.139681		CO_2e	19156.285894

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
VOC	1.747106		PM 10	12.558932
SO_x	6.376212		PM 2.5	11.282660
NO_x	145.029869		Pb	0.000000
CO	22.275147		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	6219.576015		CO_2	19111.211727
N_2O	6219.139681		CO_2e	19156.285894

35.2 Aircraft & Engines

35.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-16C
Engine Model: F100-PW-200
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1006.00	2.05	1.07	6.21	24.06	2.47	2.22
Approach	3251.00	0.05	1.07	17.93	1.22	2.37	2.13
Intermediate	5651.00	0.07	1.07	26.55	0.38	1.58	1.42
Military	8888.00	0.11	1.07	34.32	0.56	1.66	1.49
After Burn	40123.00	0.69	1.07	6.63	10.42	3.07	2.76

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1006.00	0.13	0.03	3203.44	3214.64
Approach	3251.00	0.13	0.03	3203.44	3214.64
Intermediate	5651.00	0.13	0.03	3203.44	3214.64
Military	8888.00	0.13	0.03	3203.44	3214.64
After Burn	40123.00	0.13	0.03	3203.44	3214.64

35.3 Flight Operations

35.3.1 Flight Operations Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
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- Flight Operations

Number of Aircraft:		100
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
Number of Annual Flight Operation Cycles for all Aircraft:		1100
Number of Annual Trim Test(s) per Aircraft:		0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	14.7
Takeoff [Military] (mins):	40.05
Takeoff [After Burn] (mins):	5.26

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

AE_{FOC} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

35.4 Auxiliary Power Unit (APU)

35.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

35.4.2 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_2O	CO_2	CO_2e

35.4.3 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

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36. Aircraft

36.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
GLADBAG MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - GLADBAG MOA Alt 1

- Activity Description:
A-10 activity - GLADBAG MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.089830
SO_x	-0.038734
NO_x	-0.357532
CO	-0.358584

Pollutant	Emissions Per Year (TONs)
PM 10	-0.119366
PM 2.5	-0.107310
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-0.004876
N_2O	-0.000951

Pollutant	Emissions Per Year (TONs)
CO_2	-115.964528
CO_2e	-116.369968

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.089830
SO_x	-0.038734
NO_x	-0.357532
CO	-0.358584

Pollutant	Emissions Per Year (TONs)
PM 10	-0.119366
PM 2.5	-0.107310
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	-0.004876
N_2O	-0.000951

Pollutant	Emissions Per Year (TONs)
CO_2	-115.964528
CO_2e	-116.369968

36.2 Aircraft & Engines

36.2.1 Aircraft & Engines Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
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- Aircraft & Engine
- **Aircraft Designation:** A-10C
- **Engine Model:** TF34-GE-100
- **Primary Function:** Combat
- **Aircraft has After burn:** No
- **Number of Engines:** 2

- 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/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	390.00	39.45	1.07	2.10	106.70	8.13	7.32
Approach	920.00	2.19	1.07	5.70	16.30	6.21	5.59
Intermediate	460.00	23.35	1.07	2.60	78.00	8.93	8.04
Military	2710.00	0.12	1.07	10.70	2.20	2.66	2.39
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	390.00	0.13	0.03	3203.44	3214.64
Approach	920.00	0.13	0.03	3203.44	3214.64
Intermediate	460.00	0.13	0.03	3203.44	3214.64
Military	2710.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

36.3 Flight Operations

36.3.1 Flight Operations Assumptions

- Flight Operations
- **Number of Aircraft:** 10
- **Flight Operation Cycle Type:** LTO (Landing and Takeoff)
- **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):** 24
- **Takeoff [Military] (mins):** 36
- **Takeoff [After Burn] (mins):** 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	12
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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

AE_{FOC} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

36.4 Auxiliary Power Unit (APU)

36.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

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

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

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? Remove

- Activity Location
Fuzzy MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - Fuzzy MOA Alt 1

- Activity Description:
F-35 activity - Fuzzy MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date

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

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.020249
SO_x	-7.799580
NO_x	-137.901207
CO	-22.499645

Pollutant	Emissions Per Year (TONs)
PM 10	-8.712811
PM 2.5	-7.837955
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-6510.164644
N_2O	-6509.593880

Pollutant	Emissions Per Year (TONs)
CO_2	-23373.602622
CO_2e	-23432.563754

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.020249
SO_x	-7.799580
NO_x	-137.901207
CO	-22.499645

Pollutant	Emissions Per Year (TONs)
PM 10	-8.712811
PM 2.5	-7.837955
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	-6510.164644
N_2O	-6509.593880

Pollutant	Emissions Per Year (TONs)
CO_2	-23373.602622
CO_2e	-23432.563754

37.2 Aircraft & Engines

37.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb fuel)
Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

37.3 Flight Operations

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
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37.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:		100
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
Number of Annual Flight Operation Cycles for all Aircraft:		700
Number of Annual Trim Test(s) per Aircraft:		0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	21.75
Takeoff [Military] (mins):	29.1
Takeoff [After Burn] (mins):	9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

37.4 Auxiliary Power Unit (APU)

37.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

37.4.2 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_2O	CO_2	CO_2e

37.4.3 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

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38. Aircraft

38.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
SELLS MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - SELLS MOA Alt 1

- Activity Description:
F-35 activity - SELLS MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.283492
SO_x	-109.194126
NO_x	-1930.616902
CO	-314.995036

Pollutant	Emissions Per Year (TONs)
PM 10	-121.979352
PM 2.5	-109.731366
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-91142.305022
N_2O	-91134.314314

Pollutant	Emissions Per Year (TONs)
CO_2	-327230.436707
CO_2e	-328055.892549

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.283492
SO_x	-109.194126
NO_x	-1930.616902
CO	-314.995036

Pollutant	Emissions Per Year (TONs)
PM 10	-121.979352
PM 2.5	-109.731366
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	-91142.305022
N_2O	-91134.314314

Pollutant	Emissions Per Year (TONs)
CO_2	-327230.436707
CO_2e	-328055.892549

38.2 Aircraft & Engines

38.2.1 Aircraft & Engines Assumptions

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- Aircraft & Engine

Aircraft Designation:	F-35A
Engine Model:	F135-PW-100
Primary Function:	Combat
Aircraft has After burn:	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/1000lb 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:		100
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
Number of Annual Flight Operation Cycles for all Aircraft:		9800
Number of Annual Trim Test(s) per Aircraft:		0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	21.75
Takeoff [Military] (mins):	29.1
Takeoff [After Burn] (mins):	9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

38.4 Auxiliary Power Unit (APU)

38.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

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_2O	CO_2	CO_2e

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

39. Aircraft

39.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
GLADBAG MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - GLADBAG Alt 1

- Activity Description:
F-35 activity- GLADBAG Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.156210
SO_x	-60.168192
NO_x	-1063.809313
CO	-173.568693

Pollutant	Emissions Per Year (TONs)
PM 10	-67.213112
PM 2.5	-60.464222
Pb	0.000000
NH_3	0.000000

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- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-50221.270114
N_2O	-50216.867071

Pollutant	Emissions Per Year (TONs)
CO_2	-180310.648798
CO_2e	-180765.491813

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.156210
SO_x	-60.168192
NO_x	-1063.809313
CO	-173.568693

Pollutant	Emissions Per Year (TONs)
PM 10	-67.213112
PM 2.5	-60.464222
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	-50221.270114
N_2O	-50216.867071

Pollutant	Emissions Per Year (TONs)
CO_2	-180310.648798
CO_2e	-180765.491813

39.2 Aircraft & Engines

39.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb 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: 100
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 5400
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	0
Approach [Approach] (mins):	0
Climb Out [Intermediate] (mins):	21.75
Takeoff [Military] (mins):	29.1
Takeoff [After Burn] (mins):	9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

39.4 Auxiliary Power Unit (APU)

39.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

39.4.2 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_2O	CO_2	CO_2e

39.4.3 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

40. Aircraft

40.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
MORENCI MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

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- Activity Title: annual sortie activity for GHG emissions - MORENCI MOA Alt 1

- Activity Description:
F-35 activity- MORENCI MOA Alt 1- MORENCI MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004339
SO_x	-1.671339
NO_x	-29.550259
CO	-4.821353

Pollutant	Emissions Per Year (TONs)
PM 10	-1.867031
PM 2.5	-1.679562
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-1395.035281
N_2O	-1394.912974

Pollutant	Emissions Per Year (TONs)
CO_2	-5008.629133
CO_2e	-5021.263661

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.004339
SO_x	-1.671339
NO_x	-29.550259
CO	-4.821353

Pollutant	Emissions Per Year (TONs)
PM 10	-1.867031
PM 2.5	-1.679562
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	-1395.035281
N_2O	-1394.912974

Pollutant	Emissions Per Year (TONs)
CO_2	-5008.629133
CO_2e	-5021.263661

40.2 Aircraft & Engines

40.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:

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Original Engine Name:

40.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb 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:	10
Flight Operation Cycle Type:	LTO (Landing and Takeoff)
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
Climb Out [Intermediate] (mins):	21.75
Takeoff [Military] (mins):	29.1
Takeoff [After Burn] (mins):	9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

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- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

40.4 Auxiliary Power Unit (APU)

40.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

40.4.2 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_2O	CO_2	CO_2e

40.4.3 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

41. Aircraft

41.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
JACKAL MOA
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: annual sortie activity for GHG emissions - JACKAL MOA Alt 1

- Activity Description:
F-35 activity - JACKAL MOA Alt 1

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.011571
SO_x	-4.456903
NO_x	-78.800690
CO	-12.856940

Pollutant	Emissions Per Year (TONs)
PM 10	-4.978749
PM 2.5	-4.478831
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-3720.094083
N_2O	-3719.767931

Pollutant	Emissions Per Year (TONs)
CO_2	-13356.344355
CO_2e	-13390.036431

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.011571
SO_x	-4.456903
NO_x	-78.800690

Pollutant	Emissions Per Year (TONs)
PM 10	-4.978749
PM 2.5	-4.478831
Pb	0.000000

CO	-12.856940		NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
CH_4	-3720.094083		CO_2	-13356.344355
N_2O	-3719.767931		CO_2e	-13390.036431

41.2 Aircraft & Engines

41.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: 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/1000lb 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: 10
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 400
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 0
Approach [Approach] (mins): 0
Climb Out [Intermediate] (mins): 21.75
Takeoff [Military] (mins): 29.1
Takeoff [After Burn] (mins): 9.15

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

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 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

41.4 Auxiliary Power Unit (APU)

41.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

41.4.2 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_2O	CO_2	CO_2e

41.4.3 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

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 an analysis to estimate GHG emissions and assess the theoretical Social Cost of Greenhouse Gases (SC GHG) associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide. This report provides a summary of GHG emissions and SC GHG analysis.

Report generated with ACAM version: 5.0.23a

a. Action Location:
Special Use Airspaces: Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby, and Fuzzy MOAs
State: Arizona and a small area in New Mexico
County(s): various
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: SUA Optimizaiton

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Increase airspace and low altitude airspace

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 start through the expected life cycle of the action. The life cycle for Air Force actions with "steady state" emissions (SS, net gain/loss in emission stabilized and the action is fully implemented) is assumed to be 10 years beyond the SS emissions year or 20 years beyond SS emissions year for aircraft operations related actions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (NO_2). 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 CO_2 equivalents (CO_2e). The CO_2e 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 CO_2. 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 ton per year (ton/yr) of CO_2e (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 (CO_2e) 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 (CO_2e) 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 life cycle of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	CO2	CH4	N2O	CO2e	Threshold	Exceedance
2025	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2026 [SS Year]	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2027	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2028	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2029	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2030	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2031	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2032	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2033	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2034	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2035	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2036	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2037	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2038	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2039	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2040	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2041	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2042	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2043	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2044	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2045	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes
2046	136,736	56543.75479129	56541.04059362	137,016	68,039	Yes

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	CO2	CH4	N2O	CO2e
2025	90,756,232	249,199	22,164	91,027,596
2026 [SS Year]	90,756,232	249,199	22,164	91,027,596
2027	90,756,232	249,199	22,164	91,027,596
2028	90,756,232	249,199	22,164	91,027,596
2029	90,756,232	249,199	22,164	91,027,596
2030	90,756,232	249,199	22,164	91,027,596
2031	90,756,232	249,199	22,164	91,027,596
2032	90,756,232	249,199	22,164	91,027,596
2033	90,756,232	249,199	22,164	91,027,596
2034	90,756,232	249,199	22,164	91,027,596
2035	90,756,232	249,199	22,164	91,027,596
2036	90,756,232	249,199	22,164	91,027,596
2037	90,756,232	249,199	22,164	91,027,596
2038	90,756,232	249,199	22,164	91,027,596
2039	90,756,232	249,199	22,164	91,027,596
2040	90,756,232	249,199	22,164	91,027,596

2041	90,756,232	249,199	22,164	91,027,596
2042	90,756,232	249,199	22,164	91,027,596
2043	90,756,232	249,199	22,164	91,027,596
2044	90,756,232	249,199	22,164	91,027,596
2045	90,756,232	249,199	22,164	91,027,596
2046	90,756,232	249,199	22,164	91,027,596

U.S. Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2025	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2026 [SS Year]	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2027	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2028	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2029	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2030	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2031	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2032	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2033	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2034	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2035	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2036	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2037	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2038	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2039	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2040	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2041	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2042	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2043	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2044	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2045	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2046	5,136,454,179	25,626,912	1,500,708	5,163,581,798

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 (yGba.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 to 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.

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (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 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**
2025-2046	State Total	1,996,637,108	5,482,389	487,614	2,002,607,111
2025-2046	U.S. Total	113,001,991,938	563,792,057	33,015,568	113,598,799,563
2025-2046	Action	3,008,184	1243962.605408	1243902.89306	3,014,352
Percent of State Totals		0.15066253%	22.69015625%	255.09988846%	0.15052141%
Percent of U.S. Totals		0.00266206%	0.22064209%	3.76762530%	0.00265351%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00035557%.*

* Global value based on the U.S. emits 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).

Climate Change Assessment (as SC GHG):

On a global scale, the potential climate change effects of an action are indirectly addressed and put into context through providing the theoretical SC GHG associated with an action. The SC GHG is an administrative and theoretical tool intended to provide additional context to a GHG's potential impacts through approximating the long-term monetary damage that may result from GHG emissions affect on climate change. It is important to note that the SC GHG is a monetary quantification, in 2020 U.S. dollars, of the theoretical economic damages that could result from emitting GHGs into the atmosphere.

The SC GHG estimates are derived using the methodology and discount factors in the "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990," released by the Interagency Working Group on Social Cost of Greenhouse Gases (IWG SC GHGs) in February 2021.

The speciated IWG Annual SC GHG Emission associated with an action (or alternative) are first estimated as annual unit cost (cost per metric ton, $/mton). Results of the annual IWG Annual SC GHG Emission Assessments are tabulated in the IWG Annual SC GHG Cost per Metric Ton Table below:

IWG SC GHG Discount Factor: 2.5%

IWG Annual SC GHG Cost per Metric Ton ($/mton [In 2020 $])			
YEAR	**CO2**	**CH4**	**N2O**
2025	$83.00	$2,200.00	$30,000.00
2026 [SS Year]	$84.00	$2,300.00	$30,000.00
2027	$86.00	$2,300.00	$31,000.00
2028	$87.00	$2,400.00	$32,000.00
2029	$88.00	$2,500.00	$32,000.00
2030	$89.00	$2,500.00	$33,000.00
2031	$91.00	$2,600.00	$33,000.00
2032	$92.00	$2,600.00	$34,000.00
2033	$94.00	$2,700.00	$35,000.00
2034	$95.00	$2,800.00	$35,000.00

2035	$96.00	$2,800.00	$36,000.00
2036	$98.00	$2,900.00	$36,000.00
2037	$99.00	$3,000.00	$37,000.00
2038	$100.00	$3,000.00	$38,000.00
2039	$102.00	$3,100.00	$38,000.00
2040	$103.00	$3,100.00	$39,000.00
2041	$104.00	$3,200.00	$39,000.00
2042	$106.00	$3,300.00	$40,000.00
2043	$107.00	$3,300.00	$41,000.00
2044	$108.00	$3,400.00	$41,000.00
2045	$110.00	$3,500.00	$42,000.00
2046	$111.00	$3,500.00	$43,000.00

Action-related SC GHG were estimated by calendar-year for the projected action's lifecycle. Annual estimates were found by multiplying the annual emission for a given year by the corresponding IWG Annual SC GHG Emission value (see table above).

Action-Related Annual SC GHG ($K/yr [In 2020 $])				
YEAR	CO2	CH4	N2O	GHG
2025	$11,349.06	$124,396.26	$1,696,231.22	$1,831,976.54
2026 [SS Year]	$11,485.79	$130,050.64	$1,696,231.22	$1,837,767.65
2027	$11,759.26	$130,050.64	$1,752,772.26	$1,894,582.16
2028	$11,896.00	$135,705.01	$1,809,313.30	$1,956,914.31
2029	$12,032.74	$141,359.39	$1,809,313.30	$1,962,705.42
2030	$12,169.47	$141,359.39	$1,865,854.34	$2,019,383.20
2031	$12,442.94	$147,013.76	$1,865,854.34	$2,025,311.04
2032	$12,579.68	$147,013.76	$1,922,395.38	$2,081,988.82
2033	$12,853.15	$152,668.14	$1,978,936.42	$2,144,457.71
2034	$12,989.89	$158,322.51	$1,978,936.42	$2,150,248.82
2035	$13,126.62	$158,322.51	$2,035,477.46	$2,206,926.60
2036	$13,400.09	$163,976.89	$2,035,477.46	$2,212,854.44
2037	$13,536.83	$169,631.26	$2,092,018.50	$2,275,186.59
2038	$13,673.56	$169,631.26	$2,148,559.54	$2,331,864.37
2039	$13,947.03	$175,285.64	$2,148,559.54	$2,337,792.22
2040	$14,083.77	$175,285.64	$2,205,100.58	$2,394,469.99
2041	$14,220.51	$180,940.02	$2,205,100.58	$2,400,261.10
2042	$14,493.98	$186,594.39	$2,261,641.62	$2,462,729.99
2043	$14,630.71	$186,594.39	$2,318,182.66	$2,519,407.77
2044	$14,767.45	$192,248.77	$2,318,182.66	$2,525,198.88
2045	$15,040.92	$197,903.14	$2,374,723.70	$2,587,667.77
2046	$15,177.66	$197,903.14	$2,431,264.75	$2,644,345.54

The following two tables summarize the U.S. and State's Annual SC GHG by calendar-year. The U.S. and State's Annual SC GHG are in 2020 dollars and were estimated by each year for the projected action lifecycle. Annual SC GHG estimates were found by multiplying the U.S. and State's annual five-year average GHG emissions for a given year by the corresponding IWG Annual SC GHG Cost per Metric Ton value.

State's Annual SC GHG ($K/yr [In 2020 $])				
YEAR	CO2	CH4	N2O	GHG
2025	$7,532,767.27	$548,238.89	$664,928.25	$8,745,934.41
2026 [SS Year]	$7,623,523.50	$573,158.84	$664,928.25	$8,861,610.59
2027	$7,805,035.97	$573,158.84	$687,092.52	$9,065,287.33
2028	$7,895,792.20	$598,078.79	$709,256.80	$9,203,127.78
2029	$7,986,548.43	$622,998.74	$709,256.80	$9,318,803.97

2030	$8,077,304.66	$622,998.74	$731,421.07	$9,431,724.47
2031	$8,258,817.13	$647,918.69	$731,421.07	$9,638,156.89
2032	$8,349,573.36	$647,918.69	$753,585.35	$9,751,077.39
2033	$8,531,085.82	$672,838.64	$775,749.62	$9,979,674.08
2034	$8,621,842.06	$697,758.59	$775,749.62	$10,095,350.26
2035	$8,712,598.29	$697,758.59	$797,913.90	$10,208,270.77
2036	$8,894,110.75	$722,678.54	$797,913.90	$10,414,703.19
2037	$8,984,866.99	$747,598.49	$820,078.17	$10,552,543.64
2038	$9,075,623.22	$747,598.49	$842,242.45	$10,665,464.15
2039	$9,257,135.68	$772,518.43	$842,242.45	$10,871,896.56
2040	$9,347,891.91	$772,518.43	$864,406.72	$10,984,817.07
2041	$9,438,648.15	$797,438.38	$864,406.72	$11,100,493.25
2042	$9,620,160.61	$822,358.33	$886,571.00	$11,329,089.94
2043	$9,710,916.84	$822,358.33	$908,735.27	$11,442,010.45
2044	$9,801,673.08	$847,278.28	$908,735.27	$11,557,686.63
2045	$9,983,185.54	$872,198.23	$930,899.55	$11,786,283.32
2046	$10,073,941.77	$872,198.23	$953,063.82	$11,899,203.83

U.S. Annual SC GHG ($K/yr [In 2020 $])				
YEAR	**CO2**	**CH4**	**N2O**	**GHG**
2025	$426,325,696.86	$56,379,205.70	$45,021,229.08	$527,726,131.63
2026 [SS Year]	$431,462,151.04	$58,941,896.86	$45,021,229.08	$535,425,276.98
2027	$441,735,059.39	$58,941,896.86	$46,521,936.72	$547,198,892.97
2028	$446,871,513.57	$61,504,588.03	$48,022,644.35	$556,398,745.96
2029	$452,007,967.75	$64,067,279.20	$48,022,644.35	$564,097,891.30
2030	$457,144,421.93	$64,067,279.20	$49,523,351.99	$570,735,053.12
2031	$467,417,330.29	$66,629,970.37	$49,523,351.99	$583,570,652.65
2032	$472,553,784.47	$66,629,970.37	$51,024,059.62	$590,207,814.46
2033	$482,826,692.83	$69,192,661.54	$52,524,767.26	$604,544,121.62
2034	$487,963,147.01	$71,755,352.70	$52,524,767.26	$612,243,266.97
2035	$493,099,601.18	$71,755,352.70	$54,025,474.90	$618,880,428.78
2036	$503,372,509.54	$74,318,043.87	$54,025,474.90	$631,716,028.31
2037	$508,508,963.72	$76,880,735.04	$55,526,182.53	$640,915,881.29
2038	$513,645,417.90	$76,880,735.04	$57,026,890.17	$647,553,043.11
2039	$523,918,326.26	$79,443,426.21	$57,026,890.17	$660,388,642.63
2040	$529,054,780.44	$79,443,426.21	$58,527,597.80	$667,025,804.45
2041	$534,191,234.62	$82,006,117.38	$58,527,597.80	$674,724,949.80
2042	$544,464,142.97	$84,568,808.54	$60,028,305.44	$689,061,256.96
2043	$549,600,597.15	$84,568,808.54	$61,529,013.08	$695,698,418.77
2044	$554,737,051.33	$87,131,499.71	$61,529,013.08	$703,397,564.12
2045	$565,009,959.69	$89,694,190.88	$63,029,720.71	$717,733,871.28
2046	$570,146,413.87	$89,694,190.88	$64,530,428.35	$724,371,033.10

Relative Comparison of SC GHG:

To provide additional real-world context to the potential climate change impact associate with an action, a Relative Comparison of SC GHG Assessment is also performed. While the SC GHG estimates capture an indirect approximation of global climate damages, the Relative Comparison of SC GHG Assessment provides a better perspective from a regional and global scale.

The Relative Comparison of SC GHG Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (yGba.e., global, national, and regional) and the SC GHG as the degree (intensity) of the proposed action’s effects. The Relative Comparison Assessment provides real-world context and allows for a reasoned choice among alternatives through a relative contrast analysis which weighs each alternative's SC GHG proportionally against (or relative to) existing global, national, and regional SC GHG. The below table provides a relative comparison between an action's SC GHG vs. state and U.S. projected SC GHG for the same time period:

Total SC-GHG ($K [In 2020 $])					
		CO2	**CH4**	**N2O**	**GHG**
2025-2046	State Total	$193,583,043.23	$15,699,568.19	$17,620,598.56	$226,903,209.98
2025-2046	U.S. Total	$10,956,056,763.81	$1,614,495,435.84	$1,193,062,570.62	$13,763,614,770.27
2025-2046	Action	$291,657.11	$3,562,256.55	$44,950,127.27	$48,804,040.94
Percent of State Totals		0.15066253%	22.69015625%	255.09988846%	21.50874857%
Percent of U.S. Totals		0.00266206%	0.22064209%	3.76762530%	0.35458738%

From a global context, the action's total SC GHG percentage of total global SC GHG for the same time period is: 0.04751471%.*

* Global value based on the U.S. emits 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).

APPENDIX L
NATURAL RESOURCES AND SECTION 7 SUPPORTING DOCUMENTATION

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APPENDIX L1
NATURAL RESOURCES

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Arizona Species of Greatest Conservation Need that Occur Beneath Airspace

Common Name	Scientific Name	Bagdad	Gladden	Sells	Ruby	Fuzzy	Tombstone	Jackal	Outlaw	Morenci	Reserve
Birds											
Northern Goshawk	*Accipiter gentilis*			x	x	x	x				
Wood Duck	*Aix sponsa*	x	x	x	x	x	x				
Violet-crowned Hummingbird	*Amazilia violiceps*			x	x	x	x				
Arizona grasshopper sparrow	*Ammodramus savannarum ammolegus*			x	x	x	x				
Western Grasshopper Sparrow	*Ammodramus savannarum perpallidus*			x	x	x	x				
Five-striped Sparrow	*Amphispiza quinquestriata*			x	x	x					
Sprague's Pipit	*Anthus spragueii*	x	x	x	x	x	x				
Buff-collared Nightjar	*Antrostomus ridgwayi*		x	x	x	x					
Golden Eagle	*Aquila chrysaetos*		x	x	x	x	x	x	x	x	
Western Burrowing Owl	*Athene cunicularia hypugaea*	x	x	x	x	x	x	x	x	x	
Juniper Titmouse	*Baeolophus ridgwayi*	x	x				x	x	x	x	
American Bittern	*Botaurus lentiginosus*	x	x	x	x	x	x	x	x	x	
Ferruginous Hawk	*Buteo regalis*			x	x	x	x	x	x	x	
Swainson's Hawk	*Buteo swainsoni*	x	x	x	x	x	x	x	x	x	
Common Black Hawk	*Buteogallus anthracinus*	x	x				x	x	x	x	
Scaled Quail	*Callipepla squamata*			x	x	x	x	x	x	x	
Costa's Hummingbird	*Calypte costae*	x	x	x	x	x	x	x	x	x	
Red-faced Warbler	*Cardellina rubrifrons*	x	x	x	x	x	x	x	x	x	
Swainson's Thrush	*Catharus ustulatus*							x	x	x	
Mountain Plover	*Charadrius montanus*						x	x	x	x	
Snowy Plover	*Charadrius nivosus nivosus*						x	x	x	x	

Common Name	Scientific Name	Bagdad	Gladden	Sells	Ruby	Fuzzy	Tombstone	Jackal	Outlaw	Morenci	Reserve
Common Nighthawk	*Chordeiles minor*		x	x	x	x	x	x	x	x	
American Dipper	*Cinclus mexicanus*							x	x	x	
Marsh Wren	*Cistothorus palustris*		x	x	x	x	x	x	x	x	
Evening Grosbeak	*Coccothraustes vespertinus*						x	x	x	x	
Yellow-billed Cuckoo (Western DPS)	*Coccyzus americanus*		x	x	x	x	x	x	x	x	
Gilded Flicker	*Colaptes chrysoides*	x	x	x	x	x		x	x	x	
Masked Bobwhite	*Colinus virginianus ridgwayi*			x	x	x					
Olive-sided Flycatcher	*Contopus cooperi*							x	x	x	
Broad-billed Hummingbird	*Cynanthus latirostris*			x	x	x	x	x	x	x	
Montezuma Quail	*Cyrtonyx montezumae*			x	x	x	x	x	x	x	
Dusky Grouse	*Dendragapus obscurus*							x	x	x	
Northern Buff-breasted Flycatcher	*Empidonax fulvifrons pygmaeus*						x	x	x	x	
Southwestern Willow Flycatcher	*Empidonax traillii extimus*						x	x	x	x	
Gray Flycatcher	*Empidonax wrightii*	x	x	x	x	x	x	x	x	x	
Rivoli's Hummingbird	*Eugenes fulgens*			x	x	x	x	x	x	x	
American Peregrine Falcon	*Falco peregrinus anatum*	x	x	x	x	x	x	x	x	x	
MacGillivray's Warbler	*Geothlypis tolmiei*							x	x	x	
Mountain Pygmy-owl	*Glaucidium gnoma gnoma*			x	x	x	x	x	x	x	
Pinyon Jay	*Gymnorhinus cyanocephalus*	x	x					x	x	x	
Bald Eagle	*Haliaeetus leucocephalus*	x	x	x	x	x	x	x	x	x	
Mississippi Kite	*Ictinia mississippiensis*						x	x	x	x	
Least Bittern	*Ixobrychus exilis*	x	x					x	x	x	

Common Name	Scientific Name	Bagdad	Gladden	Sells	Ruby	Fuzzy	Tombstone	Jackal	Outlaw	Morenci	Reserve
Yellow-eyed Junco	*Junco phaeonotus*			x	x	x	x	x	x	x	
Blue-throated Hummingbird	*Lampornis clemenciae*			x	x	x	x	x	x	x	
Whiskered Screech-owl	*Megascops trichopsis*			x	x	x	x	x	x	x	
Gila Woodpecker	*Melanerpes uropygialis*	x	x	x	x	x	x	x	x	x	
Gould's Turkey	*Meleagris gallopavo mexicana*						x	x	x	x	
Lincoln's Sparrow	*Melospiza lincolnii*	x	x	x	x	x	x	x	x	x	
Abert's Towhee	*Melozone aberti*	x	x	x	x	x	x	x	x	x	
Elf Owl	*Micrathene whitneyi*	x	x	x	x	x	x	x	x	x	
Dusky-capped Flycatcher	*Myiarchus tuberculifer*			x	x	x	x	x	x	x	
Brown-crested Flycatcher	*Myiarchus tyrannulus*	x	x	x	x	x	x	x	x	x	
Sulphur-bellied Flycatcher	*Myiodynastes luteiventris*			x	x	x	x	x	x	x	
Sage Thrasher	Oreoscoptes montanus	x	x	x	x	x	x				
Lucy's Warbler	*Oreothlypis luciae*	x	x	x	x	x	x				
Savannah Sparrow	*Passerculus sandwichensis*	x	x	x	x	x	x	x	x	x	
Band-tailed Pigeon	*Patagioenas fasciata*	x	x	x	x	x	x	x	x	x	
Gray Jay	*Perisoreus canadensis*							x	x	x	
Arizona Botteri's Sparrow	*Peucaea botterii arizonae*			x	x	x	x	x	x	x	
Rufous-winged Sparrow	*Peucaea carpalis*			x	x	x	x	x	x	x	
Olive Warbler	*Peucedramus taeniatus*	x	x	x	x	x	x	x	x	x	
Arizona Woodpecker	*Picoides arizonae*		x	x	x	x	x	x	x	x	
Pine Grosbeak	*Pinicola enucleator*							x	x	x	
Mexican Chickadee	*Poecile sclateri*						x				
Black-capped Gnatcatcher	*Polioptila nigriceps*			x	x	x					

Common Name	Scientific Name	Bagdad	Gladden	Sells	Ruby	Fuzzy	Tombstone	Jackal	Outlaw	Morenci	Reserve
Desert Purple Martin	*Progne subis hesperia*	x	x	x	x	x		x	x	x	
Flammulated Owl	*Psiloscops flammeolus*	x	x	x	x	x	x	x	x	x	
Virginia Rail	*Rallus limicola*	x	x	x	x	x		x	x	x	
Yuma Ridgway's Rail	*Rallus obsoletus yumanensis*			x	x	x					
Yellow Warbler	*Setophaga petechia*	x	x	x	x	x		x	x	x	
Azure Bluebird	*Sialia sialis fulva*			x	x	x					
Red-naped Sapsucker	*Sphyrapicus nuchalis*	x	x	x	x	x	x	x	x	x	
Williamson's Sapsucker	*Sphyrapicus thyroideus*	x	x				x	x	x	x	
Black-chinned Sparrow	*Spizella atrogularis*	x	x	x	x	x	x	x	x	x	
Brewer's Sparrow	*Spizella breweri*	x	x	x	x	x	x	x	x	x	
Mexican Spotted Owl	*Strix occidentalis lucida*	x	x	x	x	x	x	x	x	x	
Eastern Meadowlark	*Sturnella magna*	x	x	x	x	x	x	x	x	x	
LeConte's Thrasher	*Toxostoma lecontei*	x	x	x	x	x		x	x	x	
Pacific Wren	*Troglodytes pacificus*	x	x	x	x	x	x	x	x	x	
Elegant Trogon	*Trogon elegans*			x	x	x	x	x	x	x	
Quitobaquito Tryonia	*Tryonia quitobaquitae*			x	x	x					
Thick-billed Kingbird	*Tyrannus crassirostris*			x	x	x	x	x	x	x	
Arizona Bell's Vireo	*Vireo bellii arizonae*	x	x	x	x	x	x	x	x	x	
Gray Vireo	*Vireo vicinior*	x	x	x	x	x	x	x	x	x	
Mammals											
American Pronghorn	*Antilocapra americana americana*	x	x	x	x	x	x	x	x	x	
Sonoran Pronghorn	*Antilocapra americana sonoriensis*			x	x	x					
American Beaver	*Castor canadensis*	x	x	x	x	x		x	x	x	
Mexican Wolf	*Canis lupus baileyi*							x	x	x	

Common Name	Scientific Name	Bagdad	Gladden	Sells	Ruby	Fuzzy	Tombstone	Jackal	Outlaw	Morenci	Reserve
Pale Townsend’s Big-eared Bat	*Corynorhinus townsendii pallescens*			x	x	x	x	x	x	x	
Spotted Bat	*Euderma maculatum*			x	x	x	x	x	x	x	
Greater Western Bonneted Bat	*Eumops perotis californicus*			x	x	x	x	x	x	x	
Underwoods Bonneted Bat	*Eumops underwoodi*			x	x	x					
Western Red Bat	*Lasiurus blossevillii*	x	x	x	x	x	x	x	x	x	
Western Yellow Bat	*Lasiurus xanthinus*	x	x	x	x	x	x	x	x	x	
Ocelot	*Leopardus pardalis*	x	x	x	x	x	x	x	x	x	
Lesser Long-nosed Bat	*Leptonycteris yerbabuenae*			x	x	x	x	x	x	x	
Southwestern River Otter	*Lontra canadensis sonora*	x	x					x	x	x	
Mexican Desert Bighorn Sheep	*Ovis canadensis mexicana*	x	x	x	x	x					
California Leaf-nosed Bat	*Macrotus californicus*			x	x	x		x	x	x	
Black-footed Ferret	*Mustela nigripes*	x	x					x	x	x	
Arizona Myotis	*Myotis occultus*	x	x	x	x	x	x	x	x	x	
Cave Myotis	*Myotis velifer*			x	x	x	x	x	x	x	
Yuma Myotis	*Myotis yumanensis*			x	x	x	x	x	x	x	
Pocketed Free-tailed Bat	*Nyctinomops femorosaccus*	x	x	x	x	x	x				
White-tailed Deer	*Odocoileus virginianus*			x	x	x	x	x	x	x	
Rocky Mountain Bighorn Sheep	*Ovis canadensis canadensis*							x	x	x	
Mexican Desert Bighorn Sheep	*Ovis canadensis mexicana*	x	x					x	x	x	
Jaguar	*Panthera onca*	x	x	x	x	x	x	x	x	x	
Brazilian Free-tailed Bat	*Tadarida brasiliensis*	x	x	x	x	x	x	x	x	x	
Kit Fox	*Vulpes macrotis*	x	x	x	x	x	x	x	x	x	

New Mexico Species of Greatest Conservation Need that Occur Beneath Airspace

Common Name	Scientific Name	Tombstone	Morenci	Reserve
Birds				
Gould's Wild Turkey	*Meleagris gallopavo mexicana*	x	x	
Common Ground Dove	*Columbina passerina*	x	x	
Yellow-billed Cuckoo (western population)	*Coccyzus americanus occidentalis*	x	x	x
Lucifer Hummingbird	*Calothorax lucifer*	x	x	
Costa's Hummingbird	*Calypte costae*	x	x	
Broad-billed Hummingbird	*Cynanthus latirostris*	x	x	
Violet-crowned Hummingbird	*Leucolia violiceps*	x	x	
Least Tern	*Sternula antillarum*			x
Neotropic Cormorant	*Phalacrocorax brasilianus*	x	x	x
Bald Eagle	*Haliaeetus leucocephalus*	x	x	x
Common Black Hawk	*Buteogallus anthracinus*	x	x	x
Whiskered Screech-Owl	*Megascops trichopsis*	x	x	
Mexican Spotted Owl	*Strix occidentalis lucida*	x	x	x
Elegant Trogon	*Trogon elegans*	x	x	x
Gila Woodpecker	*Melanerpes uropygialis*	x	x	x
Aplomado Falcon	*Falco femoralis*	x	x	
Peregrine Falcon	*Falco peregrinus*	x	x	x
Northern Beardless-Tyrannulet	*Camptostoma imberbe*	x	x	
Thick-billed Kingbird	*Tyrannus crassirostris*	x	x	x
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	x	x	x
Bell's Vireo	*Vireo bellii*	x	x	x
Gray Vireo	*Vireo vicinior*	x	x	x
Arizona Grasshopper Sparrow	*Ammodramus savannarum ammolegus*	x	x	
Yellow-eyed Junco	*Junco phaeonotus*	x	x	
Baird's Sparrow	*Centronyx bairdii*	x	x	x
Abert's Towhee	*Melozone aberti*	x	x	
Varied Bunting	*Passerina versicolor*	x	x	x
Mammals				
White-sided Jackrabbit	*Lepus callotis*	x	x	
Arizona Shrew	*Sorex arizonae*	x	x	
Mexican Long-nosed Bat	*Leptonycteris nivalis*	x	x	
Lesser Long-nosed Bat	*Leptonycteris yerbabuenae*		x	
Western Yellow Bat	*Dasypterus xanthinus*	x	x	
Spotted Bat	*Euderma maculatum*		x	x
Mexican Gray Wolf	*Canis lupus baileyi*	x	x	x
Jaguar	*Panthera onca*	x	x	
Arizona Montane Vole	*Microtus montanus arizonensis*		x	x
Meadow Jumping Mouse	*Zapus luteus luteus*		x	x
Southern Pocket Gopher	*Thomomys umbrinus intermedius*	x	x	

APPENDIX L2
SECTION 7 CONSULTATION DOCUMENTATION

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

U.S. Fish and Wildlife
Field Supervisor
Attn: Mr. Jeff Humphrey
Arizona Ecological Services Field Office
9828 North 31st Avenue, #C3
Phoenix, AZ 85051

JAN 10 2022

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Mr. Humphrey:

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Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Enclosures: 1. Project Area Map
2. In-person Public Meeting Locations and Schedule

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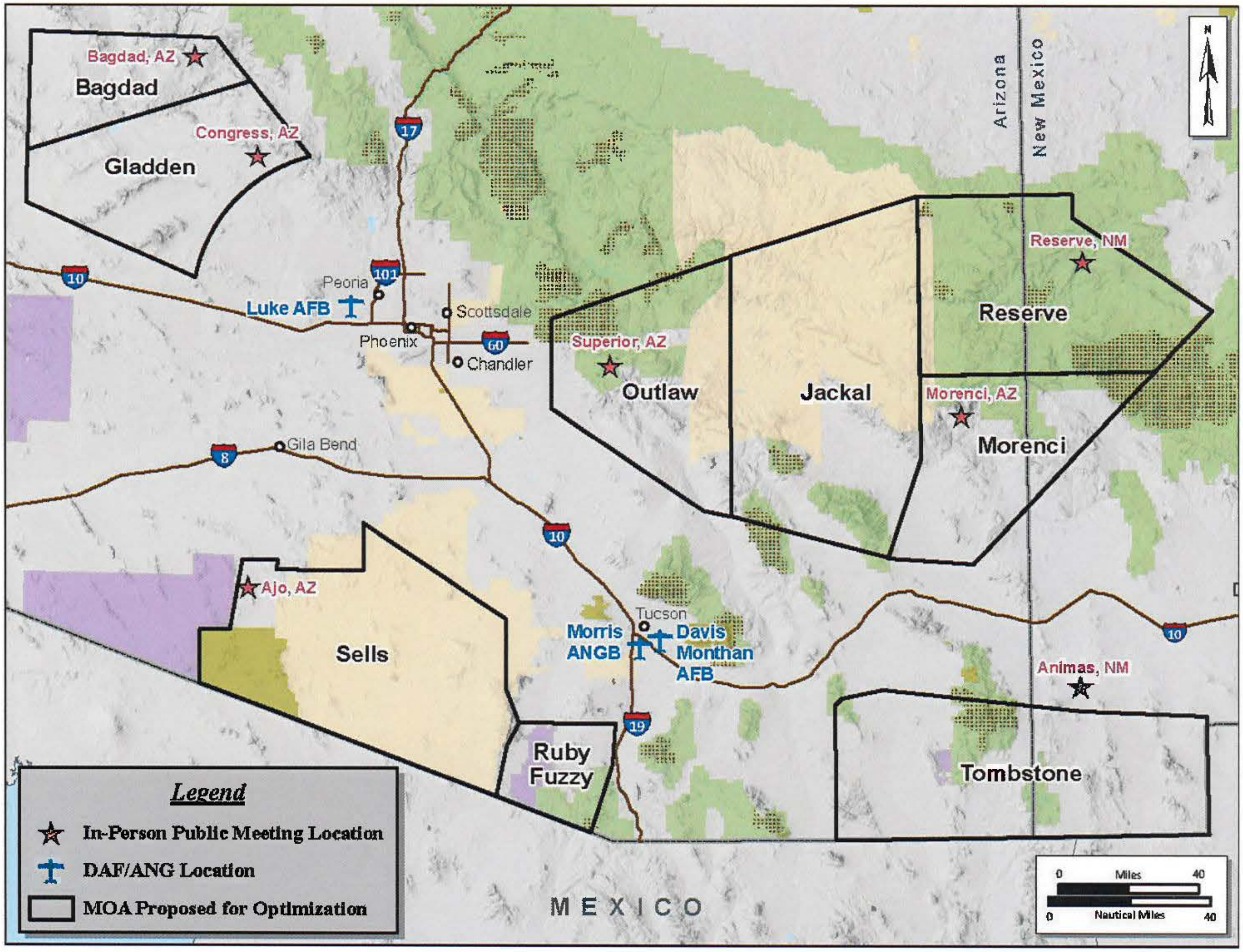
Bagdad, AZ
Bagdad
Congress, AZ
Gladden
Arizona
New Mexico
Reserve, NM
Reserve
Peoria
Luke AFB
Scottsdale
Phoenix
Chandler
Superior, AZ
Outlaw
Jackal
Morenci, AZ
Morenci
Gila Bend
Ajo, AZ
Sells
Tucson
Morris ANGB
Davis Monthan AFB
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Ruby Fuzzy
Tombstone
Legend
In-Person Public Meeting Location
DAF/ANG Location
MOA Proposed for Optimization
MEXICO
0 Miles 40
0 Nautical Miles 40

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

U.S. Fish and Wildlife
Field Supervisor
Attn: Mr. Shawn Sartorious
New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque, NM 87113

JAN 10 2022

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

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Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

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2. In-person Public Meeting Locations and Schedule

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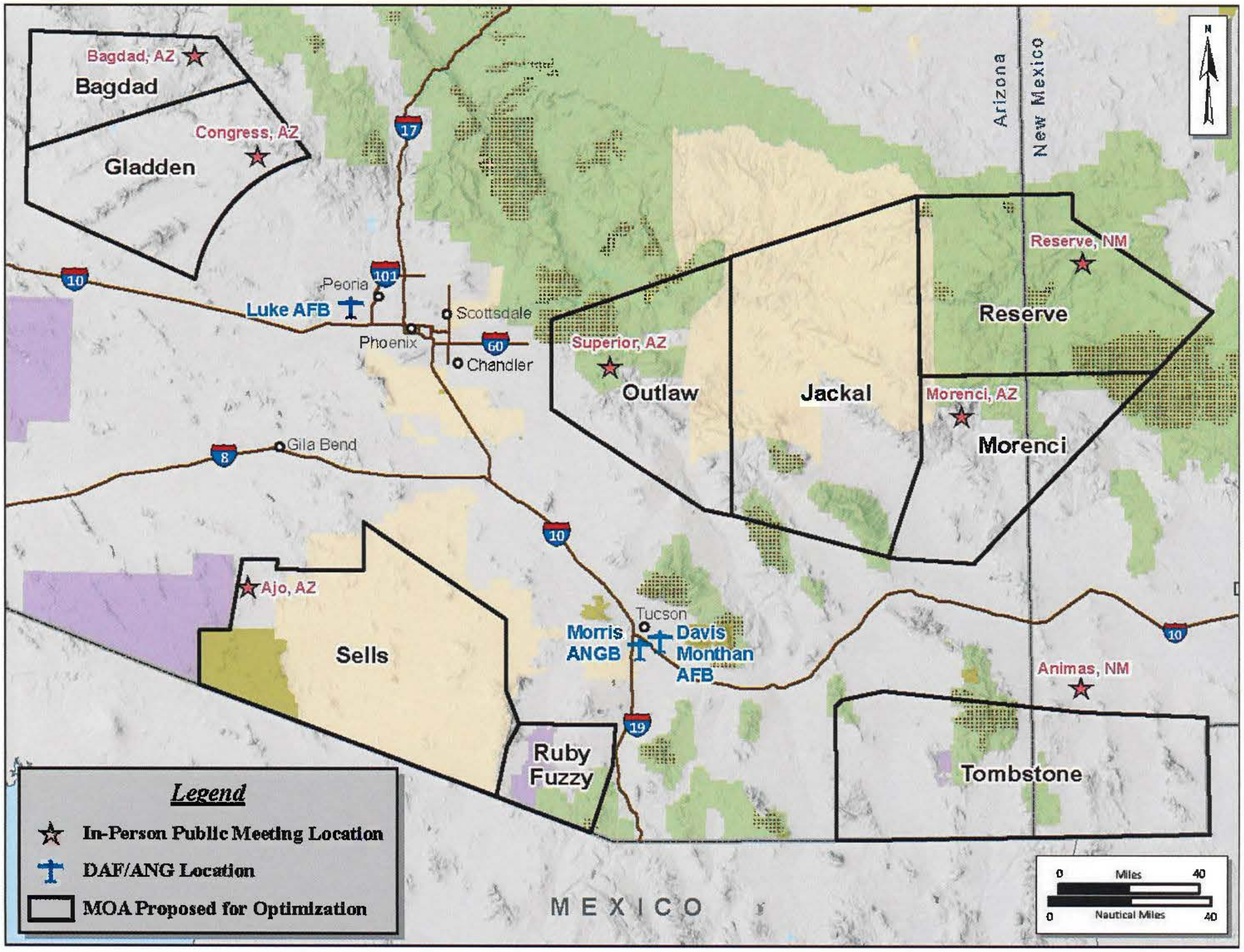

Bagdad, AZ
Bagdad
Congress, AZ
Gladden
Arizona
New Mexico
N
10
17
101
Peoria
Luke AFB
Scottsdale
Phoenix
60
Chandler
Superior, AZ
Outlaw
Jackal
Reserve, NM
Reserve
Morenci, AZ
Morenci
8
Gila Bend
10
Ajo, AZ
Sells
Tucson
Morris ANGB
Davis Monthan AFB
10
Animas, NM
19
Ruby Fuzzy
Tombstone
MEXICO
0 Miles 40
0 Nautical Miles 40
Legend
In-Person Public Meeting Location
DAF/ANG Location
MOA Proposed for Optimization

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

US Fish and Wildlife Service Southwest Region
Chief, Endangered Species
Attn: Ms. Susan Jacobsen
500 Gold Avenue, SW
Albuquerque, NM 87102

JAN 10 2022

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

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CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

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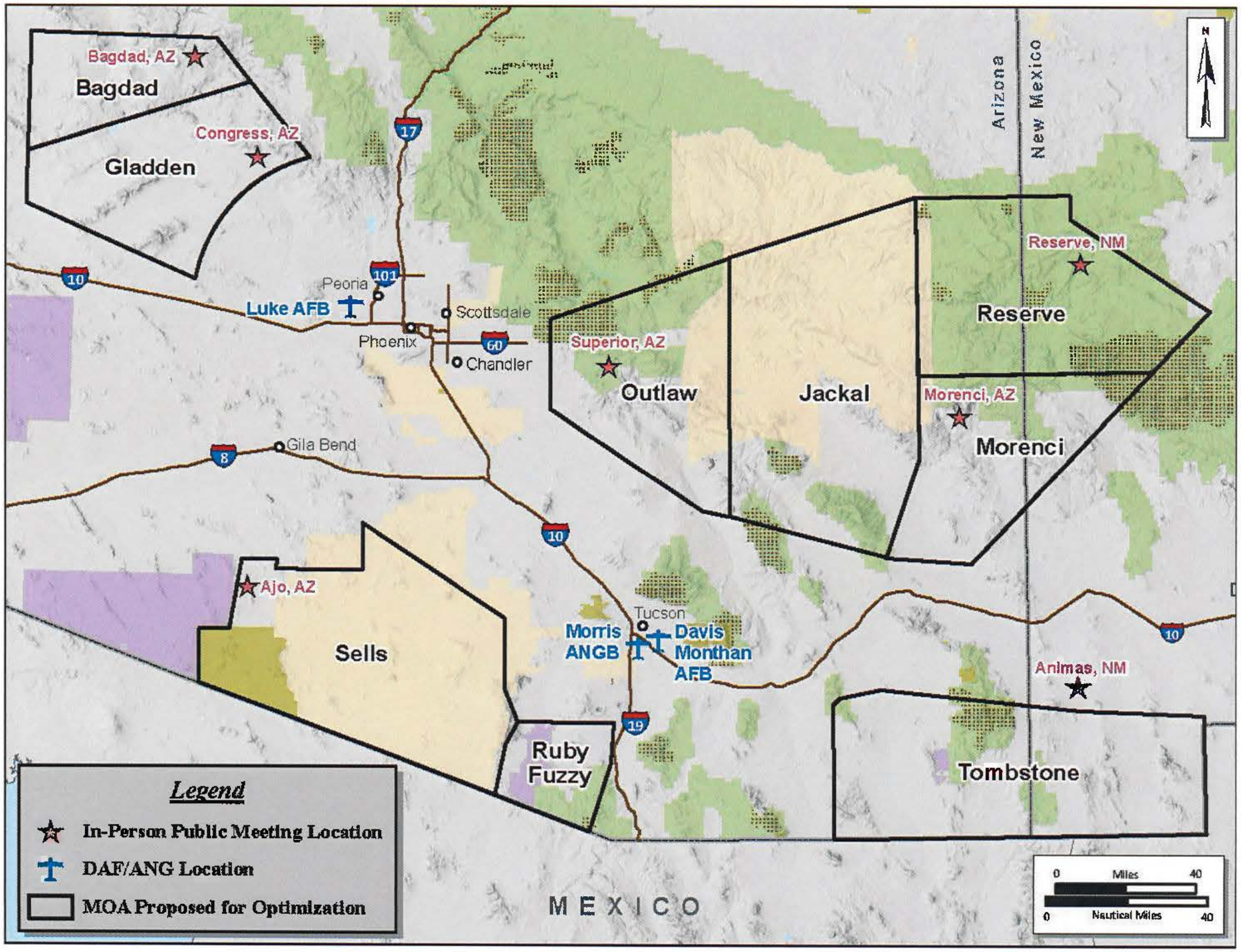

Bagdad, AZ
Bagdad
Congress, AZ
Gladden
Arizona
New Mexico
N
17
10
101
Peoria
Luke AFB
Scottsdale
Phoenix
60
Chandler
Superior, AZ
Outlaw
Jackal
Reserve, NM
Reserve
Morenci, AZ
Morenci
8
Gila Bend
10
Ajo, AZ
Sells
Tucson
Morris ANGB
Davis Monthan AFB
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Animas, NM
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United States Department of the Interior
Fish and Wildlife Service
Arizona Ecological Services Office
9828 North 31st Avenue, Suite C3
Phoenix, Arizona 85051
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:

2022-0011114-S7-001

February 23, 2022

Mr. Christopher L. Brewster, Chief
Environmental Division
Davis-Monthan Air Force Base, Arizona Regional Airspace Environmental Impact Study
501 Butler Farm Road, Suite H

Dear Mr. Brewster:

Thank you for seeking our input regarding the Air Force's Environmental Impact Study evaluating the effects of optimizing airspace across Arizona and New Mexico. Your scoping notice identified non-hazardous military flight training needs for Luke and Davis-Monthan Air Force Bases and Morris Air National Guard Base activities, such as basic air combat maneuvers and low-altitude operations.

The Air Force is proposing regional airspace modifications to address training shortfalls caused by the insufficient existing special use airspace. These modification include: changing the published times of use; adjusting the horizontal dimensions of one Military Operation Airspace (MOA); lowering the defined floor of some MOAs for additional low-altitude training; and adjusting the attributes of some airspace for supersonic flight below 30,000 feet mean sea level and use of chaff and flares. The proposed action does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment.

We anticipate the proposed action, through noise, sonic booms, potential for fire ignitions, and other actions could affect a suite of federally-listed mammals, birds, reptiles, amphibians, fish, and plants, including, but not limited to the jaguar (*Panthera onca*), Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*), New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), Mexican long-nosed bat (*Leptonycteris nivalis*), Mexican spotted owl (*Strix occidentalis lucida*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus*), narrow-headed gartersnake (*Thamnophis rufipunctatus*), northern Mexican gartersnake (*Thamnophis eques megalops*), New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*), and Chiricahua leopard frog *(Rana chiricahuensis*). We anticipate an analysis for the non-essential experimental Mexican wolf (*Canis lupus baileyi*) and northern aplomado falcon (*Falco femoralis septentrionalis*) populations may be necessary, as well as the proposed threatened cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*).

We also encourage coordination with our Regional Migratory Birds Division for compliance with the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act (Eagle Act). The Arizona Ecological Services Office recently collaborated with Arizona Game and Fish Department (AGFD) and Luke Air Force Base on Eagle Act compliance for low level training routes, which included evaluating years of AGFD and multi-agency golden eagle and bald eagle nesting locations, nest occupancy, and reproduction information. We expect the Air Force will take similar consideration for nesting bald and golden eagles across broader areas of Arizona and New Mexico associated with this proposed action.

Indian tribes may have concerns about listed species, other species protected by Federal law, or other unprotected species. We recommend you contact Tribes to determine if tribal species of concern occur in your action area, or if there are other tribal concerns about the effects of your proposed action. We also encourage you to invite Tribes and the Bureau of Indian Affairs to participate in the review of your proposed action.

We encourage you to seek listed species information from our Information for Planning and Consultation website. Because this action occurs in both New Mexico and Arizona, it will require staff within both the Arizona and New Mexico Ecological Service's offices. We anticipate that a single Field Office and point of contact, likely in Arizona, will be the lead for any Section 7 Endangered Species Act consultation. In all future correspondence on this project, please refer to consultation number 2022-0011114-S7-001.

We appreciate your ongoing efforts and consideration for threatened and endangered species, migratory birds, and eagles.

Sincerely,

for Mark A. Lamb
Acting Field Supervisor

cc (electronic):
- Civil Engineer Center, Davis-Monthan Air Force Base, Tucson, AZ (Attn. Kevin Wakefield)
- Deputy Field Supervisor, U.S. Fish and Wildlife Service, Tucson, AZ
- Assistant Field Supervisor, U.S. Fish and Wildlife Service, Phoenix, AZ
- Field Supervisor, U.S. Fish and Wildlife Service, Albuquerque, NM
- Chief, Migratory Birds Division, U.S. Fish and Wildlife Service, Albuquerque, NM
- Regional Environmental Review Branch, U.S. Fish and Wildlife Service, Albuquerque, NM (Attn: Brian Wooldridge)
- Environmental Protection Officer, Bureau of Indian Affairs-Western Region, Phoenix, AZ

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Raptor Management Coordinator, Arizona Game and Fish Department, Phoenix, AZ

The Information for Planning and Consultation (IPaC) for the collective MOAs is provided in this Appendix. The individual IPaC reports for each MOA are available for review on the project website: [www.arizonaregionalairspaceeis.com/documents.](http://www.arizonaregionalairspaceeis.com/documents)

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IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Arizona and New Mexico

Local offices

Arizona Ecological Services Field Office

(602) 242-0210
(602) 242-2513

9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517

New Mexico Ecological Services Field Office

(505) 346-2525
(505) 346-2542

2105 Osuna Road Ne
Albuquerque, NM 87113-1001

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Jaguar Panthera onca Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3944	Endangered
Mexican Long-nosed Bat Leptonycteris nivalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8203	Endangered
Mexican Wolf Canis lupus baileyi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3916	EXPN
Mount Graham Red Squirrel Tamiasciurus fremonti grahamensis Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8370	Endangered
New Mexico Meadow Jumping Mouse Zapus hudsonius luteus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/7965	Endangered
Ocelot Leopardus (=Felis) pardalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4474	Endangered

Sonoran Pronghorn Antilocapra americana sonoriensis — Endangered

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4750

Sonoran Pronghorn Antilocapra americana sonoriensis — EXPN

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4750

Birds

NAME	STATUS
Cactus Ferruginous Pygmy-owl Glaucidium brasilianum cactorum Wherever found There is **final** critical habitat for this species. https://ecos.fws.gov/ecp/species/1225	Threatened
California Least Tern Sternula antillarum browni Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered
Masked Bobwhite (quail) Colinus virginianus ridgwayi Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3484	Endangered
Mexican Spotted Owl Strix occidentalis lucida Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8196	Threatened
Northern Aplomado Falcon Falco femoralis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1923	EXPN
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/6749	Endangered

Yellow-billed Cuckoo Coccyzus americanus
Threatened

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/3911

Yuma Ridgway's Rail Rallus obsoletus yumanensis
Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3505

Reptiles

NAME
STATUS

Narrow-headed Gartersnake Thamnophis rufipunctatus
Threatened

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/2204

New Mexican Ridge-nosed Rattlesnake Crotalus willardi obscurus
Threatened

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/3657

Northern Mexican Gartersnake Thamnophis eques megalops
Threatened

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/7655

Sonoyta Mud Turtle Kinosternon sonoriense longifemorale
Endangered

Wherever found

There is **final** critical habitat for this species.
https://ecos.fws.gov/ecp/species/7276

Amphibians

NAME
STATUS

Chiricahua Leopard Frog Rana chiricahuensis | Threatened
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/1516

Fishes

NAME	STATUS
Apache Trout Oncorhynchus apache Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3532	Threatened
Beautiful Shiner Cyprinella formosa Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/7874	Threatened
Desert Pupfish Cyprinodon macularius Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/7003	Endangered
Gila Chub Gila intermedia Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/51	Endangered
Gila Topminnow (incl. Yaqui) Poeciliopsis occidentalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1116	Endangered
Gila Trout Oncorhynchus gilae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/781	Threatened

Little Colorado Spinedace Lepidomeda vittata — Threatened

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/6640

Loach Minnow Tiaroga cobitis — Endangered

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/6922

Razorback Sucker Xyrauchen texanus — Endangered

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/530

Sonora Chub Gila ditaenia — Threatened

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/1394

Spikedace Meda fulgida — Endangered

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/6493

Woundfin Plagopterus argentissimus — EXPN

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/49

Yaqui Catfish Ictalurus pricei — Threatened

Wherever found

There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/5432

Yaqui Chub Gila purpurea Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3414	Endangered

Snails

NAME	STATUS
San Bernardino Springsnail Pyrgulopsis bernardina Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/1778	Threatened
Three Forks Springsnail Pyrgulopsis trivialis Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/1017	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Acuña Cactus Echinomastus erectocentrus var. acunensis Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/5785	Endangered
Arizona Cliffrose Purshia (=Cowania) subintegra Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/866	Endangered

Arizona Erygo Eryngium sparganophyllum — Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/10705

Arizona Hedgehog Cactus Echinocereus arizonicus ssp. arizonicus — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1702

Bartram's Stonecrop Graptopetalum bartramii — Threatened

Wherever found

There is **proposed** critical habitat for this species.
https://ecos.fws.gov/ecp/species/8382

Beardless Chinchweed Pectis imberbis — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/1348

Cochise Pincushion Cactus Coryphantha robbinsorum — Threatened

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7229

Huachuca Water-umbel Lilaeopsis schaffneriana var. recurva — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/1201

Kearney's Blue-star Amsonia kearneyana — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7485

Nichol's Turk's Head Cactus Echinocactus horizonthalonius var. nicholii | Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5343

Pima Pineapple Cactus Coryphantha scheeri var. robustispina | Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4919

Swale Paintbrush Castilleja ornata | Proposed Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/10121

Wright's Marsh Thistle Cirsium wrightii | Threatened
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/8963

Zuni Fleabane Erigeron rhizomatus | Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5700

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Acuña Cactus Echinomastus erectocentrus var. acunensis https://ecos.fws.gov/ecp/species/5785#crithab	Final
Beautiful Shiner Cyprinella formosa https://ecos.fws.gov/ecp/species/7874#crithab	Final
Chiricahua Leopard Frog Rana chiricahuensis https://ecos.fws.gov/ecp/species/1516#crithab	Final

Desert Pupfish Cyprinodon macularius Final
https://ecos.fws.gov/ecp/species/7003#crithab

Gila Chub Gila intermedia Final
https://ecos.fws.gov/ecp/species/51#crithab

Jaguar Panthera onca Final
https://ecos.fws.gov/ecp/species/3944#crithab

Loach Minnow Tiaroga cobitis Final
https://ecos.fws.gov/ecp/species/6922#crithab

Mexican Spotted Owl Strix occidentalis lucida Final
https://ecos.fws.gov/ecp/species/8196#crithab

Mount Graham Red Squirrel Tamiasciurus fremonti grahamensis Final
https://ecos.fws.gov/ecp/species/8370#crithab

Narrow-headed Gartersnake Thamnophis rufipunctatus Final
https://ecos.fws.gov/ecp/species/2204#crithab

New Mexican Ridge-nosed Rattlesnake Crotalus willardi obscurus Final
https://ecos.fws.gov/ecp/species/3657#crithab

New Mexico Meadow Jumping Mouse Zapus hudsonius luteus Final
https://ecos.fws.gov/ecp/species/7965#crithab

Northern Mexican Gartersnake Thamnophis eques megalops Final
https://ecos.fws.gov/ecp/species/7655#crithab

Quitobaquito Tryonia Tryonia quitobaquitae Proposed
For information on why this critical habitat appears for your project, even though Quitobaquito Tryonia is not on the list of potentially affected species at this location, contact the local field office.
https://ecos.fws.gov/ecp/species/4521#crithab

Razorback Sucker Xyrauchen texanus Final
https://ecos.fws.gov/ecp/species/530#crithab

San Bernardino Springsnail Pyrgulopsis bernardina Final
https://ecos.fws.gov/ecp/species/1778#crithab

Sonora Chub Gila ditaenia Final
https://ecos.fws.gov/ecp/species/1394#crithab

Southwestern Willow Flycatcher Empidonax traillii extimus Final
https://ecos.fws.gov/ecp/species/6749#crithab

Spikedace Meda fulgida Final
https://ecos.fws.gov/ecp/species/6493#crithab

Three Forks Springsnail Pyrgulopsis trivialis Final
https://ecos.fws.gov/ecp/species/1017#crithab

Yaqui Catfish Ictalurus pricei Final
https://ecos.fws.gov/ecp/species/5432#crithab

Yaqui Chub Gila purpurea Final
https://ecos.fws.gov/ecp/species/3414#crithab

Yellow-billed Cuckoo Coccyzus americanus Final
https://ecos.fws.gov/ecp/species/3911#crithab

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Oct 15 to Aug 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

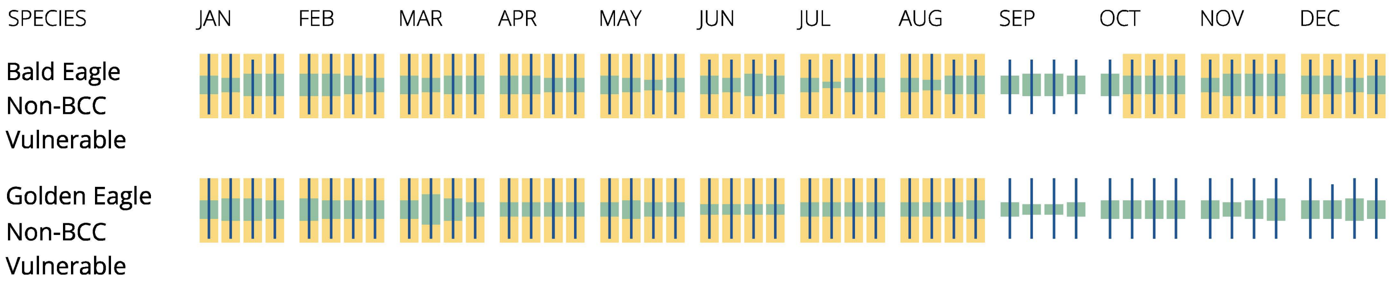
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort – no data



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Arizona Woodpecker *Picoides arizonae* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 10 to Jun 30

Baird's Sparrow Ammodramus bairdii — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5113

Bald Eagle Haliaeetus leucocephalus — Breeds Oct 15 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Bendire's Thrasher Toxostoma bendirei — Breeds Mar 15 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9435

Black Swift Cypseloides niger — Breeds Jun 15 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8878

Black-chinned Sparrow Spizella atrogularis — Breeds Apr 15 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9447

Black-throated Gray Warbler Dendroica nigrescens — Breeds May 1 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

California Gull Larus californicus — Breeds Mar 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Cassin's Sparrow Aimophila cassinii — Breeds Aug 1 to Oct 10

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9512

Chestnut-collared Longspur Calcarius ornatus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Nutcracker Nucifraga columbiana — Breeds Jan 15 to Jul 15

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Costa's Hummingbird Calypte costae — Breeds Jan 15 to Jun 10

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9470

Eastern Meadowlark Sturnella magna — Breeds Apr 25 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Elegant Trogon Trogon elegans — Breeds Apr 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Ferruginous Hawk Buteo regalis — Breeds Mar 15 to Aug 15

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/6038

Flammulated Owl Otus flammeolus — Breeds May 10 to Aug 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/7728

Gila Woodpecker Melanerpes uropygialis — Breeds Apr 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/5960

Gilded Flicker Colaptes chrysoides — Breeds May 1 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2960

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Grace's Warbler Dendroica graciae — Breeds May 20 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Le Conte's Thrasher toxostoma lecontei — Breeds Feb 15 to Jun 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8969

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-billed Curlew Numenius americanus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/5511

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Lucifer Hummingbird Calothorax lucifer — Breeds Apr 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Marbled Godwit Limosa fedoa — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Mexican Chickadee Poecile sclateri — Breeds Aug 5 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Mexican Whip-poor-will Antrostomus arizonae — Breeds May 1 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Mountain Plover Charadrius montanus — Breeds Apr 15 to Aug 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3638

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pectoral Sandpiper Calidris melanotos — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Red-faced Warbler Cardellina rubrifrons — Breeds May 10 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rufous-winged Sparrow Aimophila carpalis — Breeds Jun 15 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Sprague's Pipit Anthus spragueii — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8964

Varied Bunting Passerina versicolor — Breeds Apr 25 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Virginia's Warbler Vermivora virginiae — Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9441

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Whiskered Screech-owl Megascops trichopsis — Breeds Apr 15 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Willet *Tringa semipalmata* — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

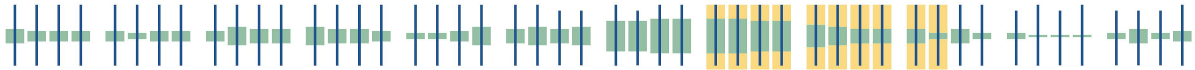
No Data (–)

A week is marked as having no data if there were no survey events for that week.

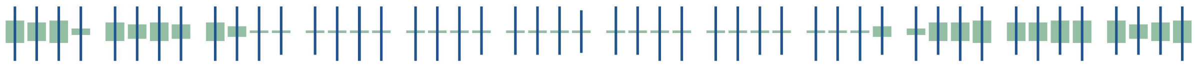
Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

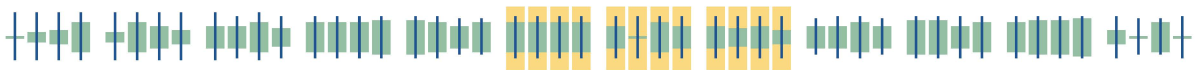
Cassin's Sparrow
BCC - BCR



Chestnut-collared Longspur
BCC Rangewide (CON)

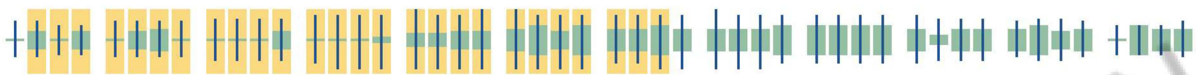


Clark's Grebe
BCC Rangewide (CON)

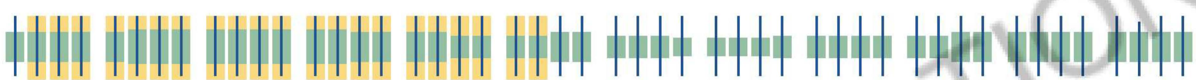


SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

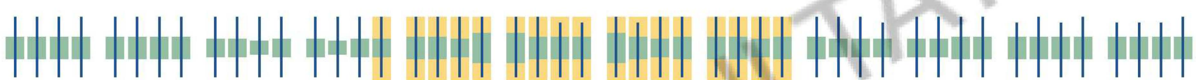
Clark's Nutcracker
BCC - BCR



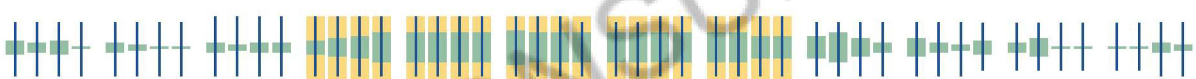
Costa's Hummingbird
BCC - BCR



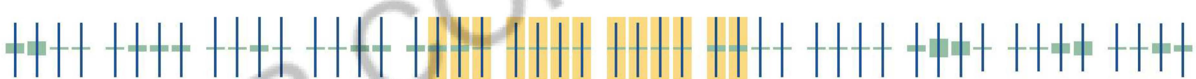
Eastern Meadowlark
BCC - BCR



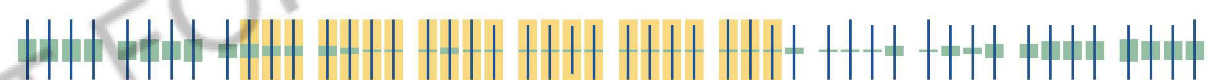
Elegant Trogon
BCC Rangewide (CON)



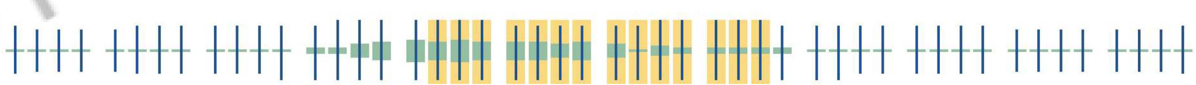
Evening Grosbeak
BCC Rangewide (CON)



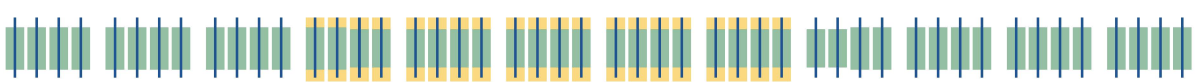
Ferruginous Hawk
BCC - BCR



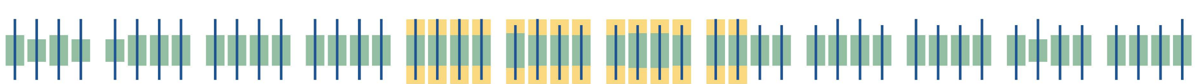
Flammulated Owl
BCC Rangewide (CON)



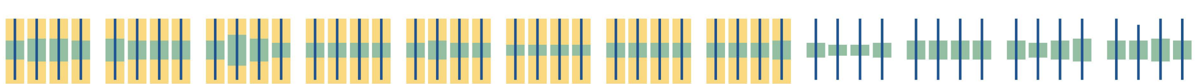
Gila Woodpecker
BCC - BCR



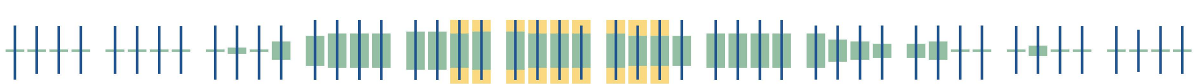
Gilded Flicker
BCC Rangewide (CON)



Golden Eagle
Non-BCC Vulnerable



Grace's Warbler
BCC - BCR



Lawrence's Goldfinch
BCC Rangewide (CON)

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Le Conte's Thrasher
BCC Rangewide (CON)

Lesser Yellowlegs
BCC Rangewide (CON)

Lewis's Woodpecker
BCC Rangewide (CON)

Long-billed Curlew
BCC - BCR

Long-eared Owl
BCC Rangewide (CON)

Lucifer Hummingbird
BCC Rangewide (CON)

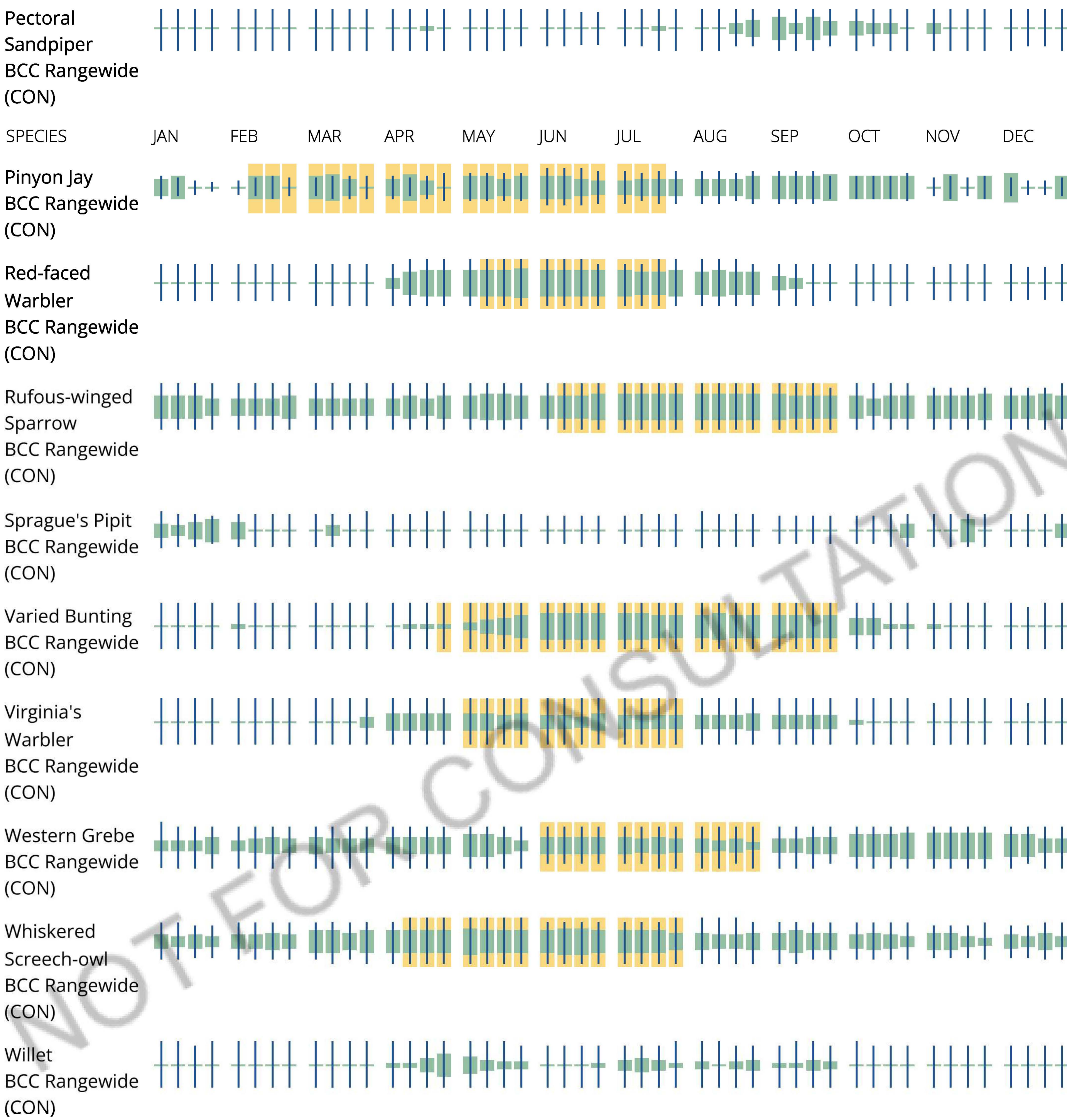
Marbled Godwit
BCC Rangewide (CON)

Mexican Chickadee
BCC Rangewide (CON)

Mexican Whip-poor-will
BCC Rangewide (CON)

Mountain Plover
BCC Rangewide (CON)

Olive-sided Flycatcher
BCC Rangewide (CON)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
BILL WILLIAMS RIVER NATIONAL WILDLIFE REFUGE	4,945.05 acres
BUENOS AIRES NATIONAL WILDLIFE REFUGE	27,281.45 acres
BUENOS AIRES NATIONAL WILDLIFE REFUGE	945,954.47 acres
CABEZA PRIETA NATIONAL WILDLIFE REFUGE	10.79 acres
LESLIE CANYON NATIONAL WILDLIFE REFUGE	25,644.5 acres

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

> The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the NWI map for a full list.

FRESHWATER POND

- PUBF
- PUBH

LAKE

- L

RIVERINE

- R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX M
ARCHAEOLOGICAL AND ARCHITECTURAL RESOURCES

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NRHP-Listed Archaeological and Architectural Sites Beneath Existing and Proposed MOAs/ATCAAs

Resource	MOA/ATCAA	County	City/Town
Archaeological Resources			
Evergreen Cemetery	Tombstone	Cochise	Bisbee
Geronimo Surrender Site	Tombstone	Cochise	Douglas
Besh-Ba-Gowah	Outlaw	Gila	Globe
La Santa Cruz de Globe	Outlaw	Gila	Globe
Camp Date Creek	Gladden	Yavapai	Date Creek
Kearny Campsite and Trail	Morenci	Graham	Safford
Bull Pasture	Sells	Pima	Lukeville
Growler Mine Area	Sells	Pima	Lukeville
I'itoi Mo'o--Montezuma's Head and 'Oks Daha--Old Woman Sitting[1]	Sells	Pima	Ajo
Milton Mine	Sells	Pima	Lukeville
Victoria Mine	Sells	Pima	Lukeville
Architectural Resources			
Bisbee Historic District	Tombstone	Cochise	Bisbee
Bisbee Residential Historic District	Tombstone	Cochise	Bisbee
Bisbee Woman's Club Clubhouse	Tombstone	Cochise	Bisbee
Camp Naco Historic District	Tombstone	Cochise	Naco
Cima Park Fire Guard Station	Tombstone	Cochise	Douglas
Douglas Historic District	Tombstone	Cochise	Douglas
Douglas Municipal Airport	Tombstone	Cochise	Douglas
Douglas Residential Historic District	Tombstone	Cochise	Douglas
Douglas Sonoran Historic District	Tombstone	Cochise	Douglas
Douglas Underpass	Tombstone	Cochise	Douglas
Douglas, Walter, House	Tombstone	Cochise	Bisbee
El Paso and Southwestern Railroad Passenger Depot	Tombstone	Cochise	Douglas
El Paso and Southwestern Railroad YMCA	Tombstone	Cochise	Douglas
Gasden Hotel	Tombstone	Cochise	Douglas
Grand Theatre	Tombstone	Cochise	Douglas
Monte Vista Lookout Cabin	Tombstone	Cochise	Elfrida
Muheim House	Tombstone	Cochise	Bisbee
Naco Border Station	Tombstone	Cochise	Naco
Our Lady of Victory Catholic Church	Tombstone	Cochise	Pearce
Pearce General Store	Tombstone	Cochise	Pearce
St. Patrick's Roman Catholic Church	Tombstone	Cochise	Bisbee
John Treu House	Tombstone	Cochise	Bisbee
U.S. Inspection Station	Tombstone	Cochise	Douglas
U.S. Post Office and Customs House	Tombstone	Cochise	Douglas
Portal Ranger Station[2]	Proposed Tombstone Expansion	Cochise	Portal
Barfoot Lookout Complex[2]	Proposed Tombstone Expansion	Cochise	Portal
Rustler Park Fire Guard Station[2]	Proposed Tombstone Expansion	Cochise	Douglas
Bullion Plaza School	Outlaw	Gila	Miami
Butte-Cochran Charcoal Ovens	Outlaw	Pinal	Florence
Erskine P. Caldwell House	Outlaw	Pima	Tucson

Resource	MOA/ATCAA	County	City/Town
Coolidge Dam	Outlaw	Gila	San Carlos
Cordova Avenue Bridge	Outlaw	Gila	Miami
Devil's Canyon Bridge	Outlaw	Pinal	Superior
Dominion Hotel	Outlaw	Gila	Globe
The Eleven Arches	Outlaw	Pima	Tucson
Elks Building	Outlaw	Gila	Globe
Gabel House	Outlaw	Pima	Tucson
Gila County Courthouse	Outlaw	Gila	Globe
Gila Pueblo	Outlaw	Gila	Globe
Gila Valley Bank and Trust Building	Outlaw	Gila	Globe
Globe Downtown Historic District	Outlaw	Gila	Globe
Globe Mine Rescue Station	Outlaw	Gila	Globe
Holy Angels Church	Outlaw	Gila	Globe
Inspiration Avenue Bridge	Outlaw	Gila	Miami
International House	Outlaw	Gila	Globe
Kelvin Bridge	Outlaw	Pinal	Kelvin
Keystone Avenue Bridge	Outlaw	Gila	Miami
McPherson Magma Hotel	Outlaw	Pinal	Superior
Miami Avenue Bridge	Outlaw	Gila	Miami
Miami Community Church	Outlaw	Gila	Miami
Mineral Creek Bridge	Outlaw	Pinal	Kelvin
Our Lady of the Blessed Sacrament Church	Outlaw	Gila	Miami
Pinal Ranger Station	Outlaw	Gila	Globe
Queen Creek Bridge	Outlaw	Pinal	Florence Junction
Reppy Avenue Bridge	Outlaw	Gila	Miami
Rillito Race Track Historic District	Outlaw	Pima	Tucson
Salt River Bridge	Outlaw	Gila	Roosevelt
Soderman Building	Outlaw	Gila	Miami
St. John's Episcopal Church	Outlaw	Gila	Globe
Theodore Roosevelt Dam National Register District	Outlaw	Gila	Roosevelt
Boyce Thompson, Southwestern Arboretum	Outlaw	Pinal	Superior
U.S. Post Office and Courthouse	Outlaw	Gila	Globe
Winkelman Bridge	Outlaw	Pinal	Winkelman
Richard Bingham House	Jackal	Graham	Safford
Black River Bridge	Jackal	Gila	Carrizo
Bonita Store	Jackal	Graham	Bonita
Paul Brooks House	Jackal	Graham	Safford
Buena Vista Hotel	Jackal	Graham	Safford
Columbine Work Station	Jackal	Graham	Safford
T. D. Cross House	Jackal	Graham	Safford
William Charles Davis House	Jackal	Graham	Safford
Fort Apache Historic District	Jackal	Navajo	Whiteriver
Graham County Courthouse	Jackal	Graham	Safford
Heliograph Lookout Complex	Jackal	Graham	Old Columbine
Joe Horowitz House	Jackal	Graham	Safford
House at 611 Third Avenue	Jackal	Graham	Safford
North Central Avenue Streetscape Historic District	Jackal	Maricopa	Phoenix
Mathew O'Brien House	Jackal	Graham	Safford
Oddfellows Home	Jackal	Graham	Safford

Resource	MOA/ATCAA	County	City/Town
George A. Olney House	Jackal	Graham	Safford
Alonzo Hamilton Packer House	Jackal	Graham	Safford
Ridgeway, David, House	Jackal	Graham	Safford
Safford High School	Jackal	Graham	Safford
Southern Pacific Railroad Depot	Jackal	Graham	Safford
Hugh Talley House	Jackal	Graham	Safford
William Talley House	Jackal	Graham	Safford
Webb Peak Lookout Tower	Jackal	Graham	Old Columbine
James R.Welker House	Jackal	Graham	Safford
West Peak Lookout Tower	Jackal	Graham	Bonita
Wickersham, David, House	Jackal	Graham	Safford
Dan Williams House	Jackal	Graham	Safford
J. Mark Wilson House	Jackal	Graham	Safford
Woman's Club	Jackal	Graham	Safford
Harquahala Peak Observatory	Gladden	La Paz	Wenden
Rhoda Nohlechek House	Gladden	Maricopa	Wenden
Peeples Valley School	Gladden	Yavapai	Peeples Valley
Benjamin F. Billingsley House	Morenci	Duncan	Greenlee
Black Gap Bridge	Morenci	Clifton	Greenlee
Clifton Casa Grande Building	Morenci	Clifton	Greenlee
Clifton Townsite Historic District	Morenci	Clifton	Greenlee
Gila River Bridge	Morenci	Clifton	Greenlee
Park Avenue Bridge	Morenci	Clifton	Greenlee
Dell Potter Ranch House	Morenci	Clifton	Greenlee
Solomonville Road Overpass	Morenci	Safford	Greenlee
Alpine Elementary School	Reserve	Apache	Alpine
Bear Mountain Lookout Complex	Reserve	Greenlee	Mogollon Rim
Bearwallow Mountain Lookout Cabins and Shed[3]	Reserve	Catron	Bearwallow Park
Mogollon Baldy Lookout Cabin[3]	Reserve	Catron	Mogollon Baldy Peak
Mogollon Historic District[3]	Reserve	Catron	Mogollon
PS Knoll Lookout Complex	Reserve	Apache	Maverick
Fannie Hill Socorro Mines Mining Company Mill, [3]	Reserve	Catron	Mogollon
Arivaca Schoolhouse	Ruby, Fuzzy	Pima	Arivaca
Town of Ruby	Ruby, Fuzzy	Santa Cruz	Ruby and Vicinity
Ajo Townsite Historic District	Sells	Pima	Ajo
Bates Well Ranch	Sells	Pima	Ajo
Curley School	Sells	Pima	Ajo
Dos Lomitas Ranch	Sells	Pima	Ajo
El Camino del Diablo	Sells	Pima	Ajo, Lukeville, Wellton
John and Isabella Greenway House	Sells	Pima	Ajo

Notes: [1]Traditional Cultural Property.
[2]Sites located beneath the Proposed Tombstone MOA/ATCAA expansion; however, these sites lie beneath the existing Playas MOA.
[3]Located in New Mexico listed in the New Mexico State Register of Historic Places.

Source: National Register of Historic Places. Available online: https://www.nps.gov/subjects/nationalregister/database-research.htm. Last updated 28 June 2022. Accessed on 04 January 2023.

National Historic Landmarks Located Beneath Existing and Proposed MOAs/ATCAAs

Resource	MOA/ATCAA	County	City/Town
Phelps Dodge General Office Building	Tombstone	Cochise	Bisbee
San Bernardino Ranch	Tombstone	Cochise	Douglas
Double Adobe Site	Tombstone	Cochise	Cochise
Kinishba Ruins	Outlaw and Jackal	Gila	N/A
Fort Apache and Theodore Roosevelt School	Outlaw and Jackal	Navajo	Fort Apache
Sierra Bonita Ranch	Outlaw and Jackal	Cochise and Graham	N/A
Point of Pines	Morenci	Graham	N/A
Ventana Cave	Sells	Pima	N/A

Note: N/A = Not Applicable

APPENDIX N
SECTION 106 AND GOVERNMENT-TO-GOVERNMENT CONSULTATION CORRESPONDENCE

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

New Mexico Historic Preservation Division
HPD Staff
Attn: Mr. Jeff Pappas, PhD
State Historic Preservation Officer and Director
407 Galisteo Street
Suite 236
Santa Fe, NM 87501

JAN 10 2022

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Dr. Pappas,

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), the Department of the Air Force (DAF) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona. The DAF is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAA) to address training needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action is being jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for interagency and intergovernmental coordination and consultation.

A MOA is a type of special use airspace with defined spatial boundaries within the National Airspace System designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers and low-altitude operations. ATCAAs are not special use airspace but can support the same training activities that occur in MOAs. An ATCAA exists in higher altitudes within the National Airspace System and can be requested by the military to extend the usable training airspace. ATCAAs typically have the same horizontal boundaries of the underlying MOA and an agreed upon ceiling.

Many of the DAF managed MOAs available to aircrews in this region were first charted decades ago and have had minimal improvements over time to meet current and evolving training requirements. The DAF is proposing regional airspace modifications to address the training shortfalls caused by the insufficient existing special use airspace to include: changing the published times of use; adjusting the horizontal dimensions of one MOA; lowering the defined floor of some MOAs to allow for additional low-altitude training in the region; and adjusting the attributes of some airspace to allow for supersonic flight below 30,000 feet mean sea level and use of chaff and flares. The Proposed Action does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment.

The special use airspace being addressed in the EIS includes several Air Force managed MOAs and their associated ATCAAs (named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby, and Fuzzy) located throughout Arizona and a small area of western New Mexico (see Enclosure 1).

The DAF is soliciting comments on three preliminary alternatives that would optimize the existing MOAs. The EIS will also evaluate a No Action Alternative per 40 CFR 1502.14 (Alternative 1). Alternative 2 includes all proposed modifications to optimize the MOAs/ATCAAs. Alternatives 3 and 4 are variations of Alternative 2. A summary of each of these is provided below, please visit the project website (www.ArizonaRegionalAirspaceEIS.com) for detailed information on these alternatives.

Alternative 1 (No Action) – airspace optimization would not occur. None of the existing MOAs/ATCAAs would be modified.

Alternative 2 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies for training aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB due to insufficient airspace. Major actions would include: changing the published times of use for the MOAs to align with current training hours; increasing the size of the Tombstone MOA/ATCAA by moving the northern boundary approximately 10 nautical miles to the north and lowering the subsonic floor to 100 feet above ground level (AGL); lowering the subsonic floor of four MOAs to 500 feet AGL (Outlaw, Jackal, Bagdad and Gladden MOAs); authorizing the use of chaff in Tombstone MOA and lowering the altitude for releasing flares in Tombstone, Outlaw, Jackal, Bagdad, and Gladden MOAs; and authorizing supersonic flight down to 5,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

Alternative 3 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except for increasing the size of Tombstone MOA/ATCAA by expanding the northern boundary. The subsonic floor of the Tombstone MOA would still be lowered to 100 feet AGL. Additionally, to increase the low-altitude airspace available to support Davis-Monthan AFB, the subsonic floor of Jackal MOA would be lowered to 100 feet AGL.

Alternative 4 - optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except that supersonic flight would be authorized down to 10,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

The DAF published a Notice of Intent to prepare the EIS in the Federal Register initiating the scoping phase of the project, which is the first opportunity for public and stakeholder involvement in the NEPA process. We request your participation and solicit your comments on the potential alternatives to the Proposed Action and information or analyses relevant to the Proposed Action. Please provide your comments no later than **March 4, 2022** to ensure consideration in the Draft EIS in accordance with 40 CFR 1503.3(b); comments submitted after this date shall be considered forfeited. Electronic comments may be submitted on the project website any time prior to the comment deadline, www.ArizonaRegionalAirspaceEIS.com. Written comments may be submitted at the in-person public meetings or by mailing to Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666 (must be postmarked by **March 4, 2022**).

The DAF is hosting several in-person public meetings to provide information on the proposed action and the preliminary alternatives described above. You are invited to attend any of the public meetings listed in Enclosure 2. All of the meetings will be open-house style at each location on the date and times indicated. No formal presentation will be given, please attend at your convenience during the time designated. Project specific display posters will be staffed by Air Force representatives who will be available to answer questions. We encourage you to visit the project website at any time where you can preview all the materials that will be on display at the meetings. If you do not wish to attend an in-person meeting or are unable to do so, the project website provides a Virtual Meeting option that includes all of the same displays and information that will be available at the in-person meetings.

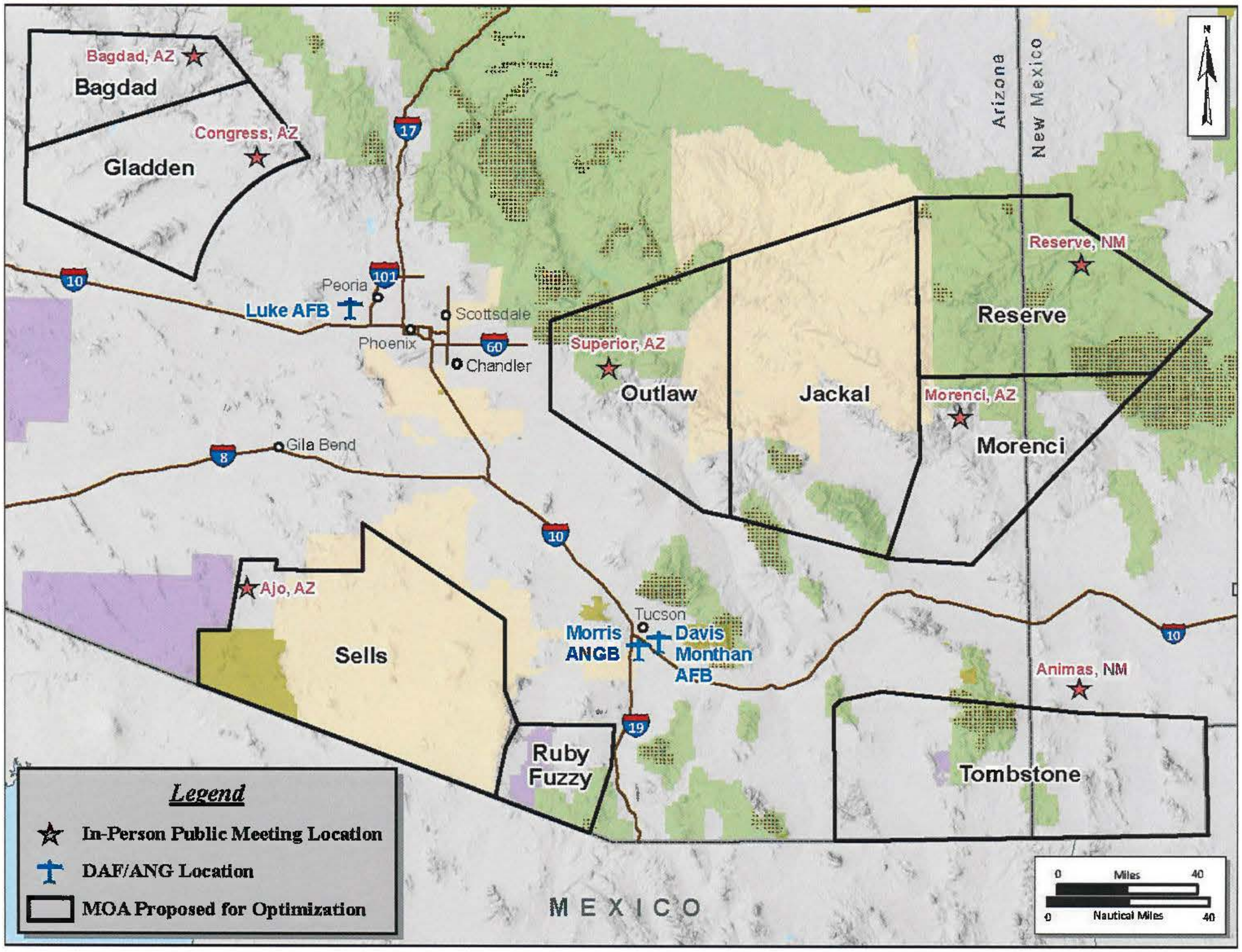
The environmental analysis for the Proposed Action is being conducted by the Air Force Civil Engineer Center. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs* and 36 CFR Part 800 of the National Historic Preservation Act, this letter requests consultation with your office regarding the Proposed Action. Additional information on determining the Area of Potential Effects, Identifying Historic Properties, and determining effects will be forthcoming as the analyses are completed. My point of contact for this consultation is Kevin Wakefield. He can be reached at (520) 228-4035, Kevin.Wakefield.1@us.af.mil. Please reach out should you have any questions.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Enclosures: 1. Project Area Map
2. In-person Public Meeting Locations and Schedule

Enclosure 1


Bagdad, AZ
Bagdad
Congress, AZ
Gladden
Arizona
New Mexico
Reserve, NM
Reserve
Peoria
Luke AFB
Scottsdale
Phoenix
Chandler
Superior, AZ
Outlaw
Jackal
Morenci, AZ
Morenci
Gila Bend
Ajo, AZ
Sells
Tucson
Morris ANGB
Davis Monthan AFB
Animas, NM
Tombstone
Ruby Fuzzy
MEXICO
Legend
In-Person Public Meeting Location
DAF/ANG Location
MOA Proposed for Optimization
Miles
Nautical Miles

Enclosure 2

In-Person Public Meeting Locations		
Date	**Time (Local)**	**Location**
Monday, February 7, 2022	5:00 – 7:00 pm	Sonoran Desert Inn & Conference Center 55 South Orilla Avenue Ajo, AZ 85321
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Tuesday, February 22, 2022	5:00 – 7:00 pm	Village Hall 15 Jake Scott Street Reserve, NM 87830-0587
Wednesday, February 23, 2022	5:00 – 7:00 pm	Clifton Community Center 100 North Coronado Blvd Clifton, AZ 85533
Thursday, February 24, 2022	5:00 – 7:00 pm	Animas High School 1 Panther Blvd Animas, NM 88020

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

Arizona State Historic Preservation Office
Attn: Ms. Kathryn Leonard
State Historic Preservation Officer
1100 W. Washington Street
#190
Phoenix, AZ 85085

JAN 10 2022

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

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Alternative 3 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except for increasing the size of Tombstone MOA/ATCAA by expanding the northern boundary. The subsonic floor of the Tombstone MOA would still be lowered to 100 feet AGL. Additionally, to increase the low-altitude airspace available to support Davis-Monthan AFB, the subsonic floor of Jackal MOA would be lowered to 100 feet AGL.

Alternative 4 - optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except that supersonic flight would be authorized down to 10,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

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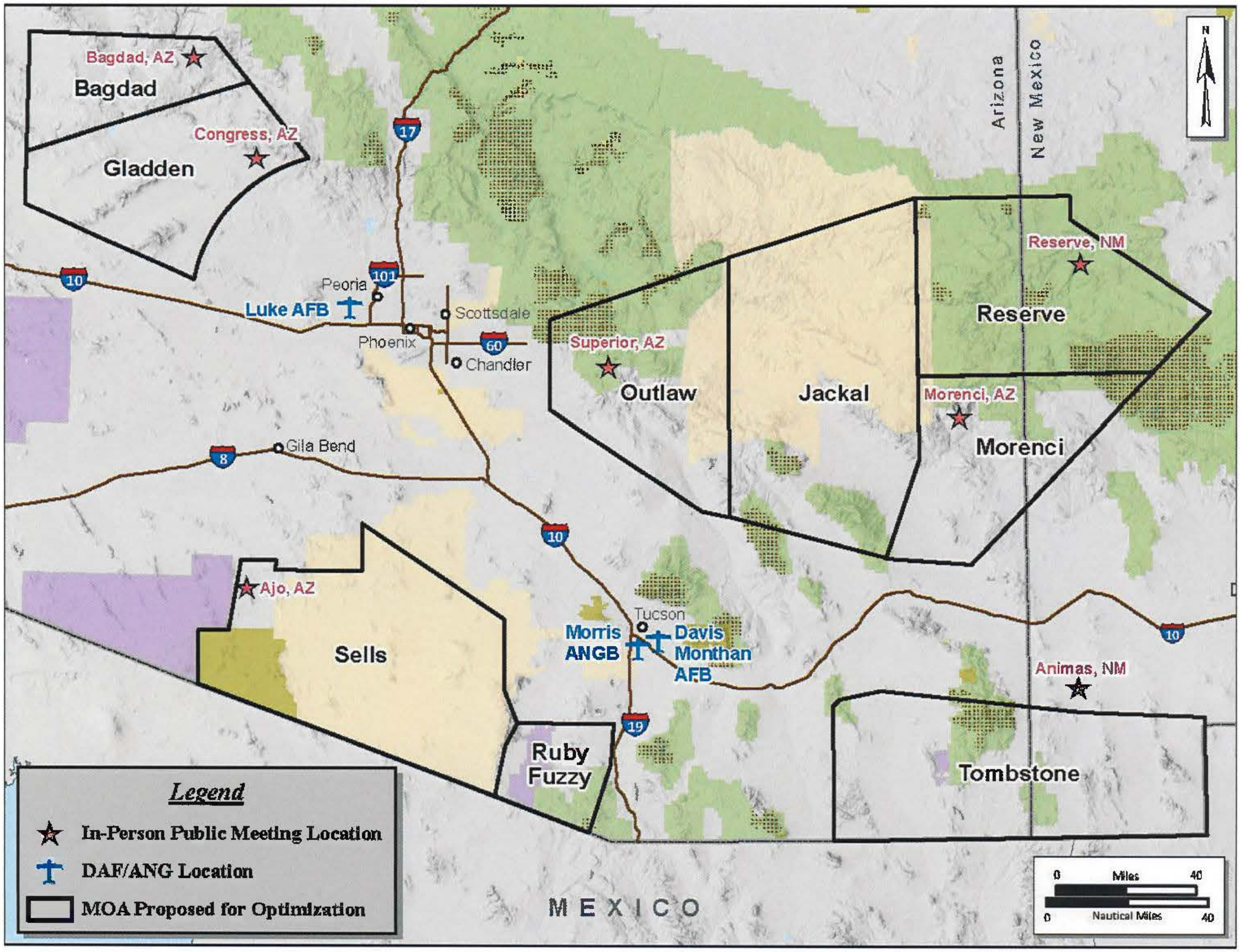
Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Enclosures:
1. Project Area Map
2. In-person Public Meeting Locations and Schedule

Enclosure 1


Bagdad, AZ
Bagdad
Congress, AZ
Gladden
Arizona
New Mexico
N
17
101
10
Peoria
Luke AFB
Scottsdale
Phoenix
60
Chandler
Superior, AZ
Outlaw
Jackal
Reserve, NM
Reserve
Morenci, AZ
Morenci
8
Gila Bend
10
Ajo, AZ
Sells
Tucson
Morris ANGB
Davis Monthan AFB
19
Ruby Fuzzy
Animas, NM
Tombstone
MEXICO
Legend
In-Person Public Meeting Location
DAF/ANG Location
MOA Proposed for Optimization
0 Miles 40
0 Nautical Miles 40

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STATE OF NEW MEXICO

DEPARTMENT OF CULTURAL AFFAIRS

HISTORIC PRESERVATION DIVISION

Michelle Lujan Grisham
Governor

BATAAN MEMORIAL BUILDING
407 GALISTEO STREET, SUITE 236
SANTA FE, NEW MEXICO 87501
PHONE (505) 827-6320 FAX (505) 827-6338

January 28, 2022

Kevin Wakefield
Department of The Air Force
355th Civil Engineering Squadron
Davis-Monthan Air Force Base, Arizona
Kevin.Wakefield.1@us.af.mil

Re: HPD Log # 116581, Notice of Intent to Prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Mr. Wakefield:

Thank you for consulting the State Historic Preservation Officer (SHPO). I am writing in response to the notice of intent to prepare an environmental impact statement for the above referenced project, which was received by this office on January 10, 2022. The SHPO looks forward to working with you as the United States Air Force (USAF) undertakes the Section 106 component of the project and when the USAF completes its determination of the area of potential effects (APE), the identification historic properties within the APE, and determines any potential effects to said properties. Finally, we recognize that various Native American Tribes in New Mexico may have concerns regarding this project and we recommend that the USAF initiate tribal consultation during the project's early stages. A consultation list of Native American Tribes in New Mexico can be found on our website at:
http://www.nmhistoricpreservation.org/outreach/native-american-consultations.html.

We can be reached at (505) 827-6320, or, if you have any concerns or questions, please contact me by phone at (505)-452-6115 or e-mail me at richard.reycraft@state.nm.us.

Sincerely,
Richard Reycraft
Richard Reycraft
Archaeological Review, New Mexico SHPO

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

SHPO-2022-0045 (162263) Rec: 01-12-22

January 10, 2022

Arizona State Historic Preservation Office
Attn: Ms. Kathryn Leonard
State Historic Preservation Officer
1100 W. Washington Street
#190
Phoenix, AZ 85085

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Ms. Leonard,

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), the Department of the Air Force (DAF) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona. The DAF is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAA) to address training needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action is being jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for interagency and intergovernmental coordination and consultation.

A MOA is a type of special use airspace with defined spatial boundaries within the National Airspace System designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers and low-altitude operations. ATCAAs are not special use airspace but can support the same training activities that occur in MOAs. An ATCAA exists in higher altitudes within the National Airspace System and can be requested by the military to extend the usable training airspace. ATCAAs typically have the same horizontal boundaries of the underlying MOA and an agreed upon ceiling.

Many of the DAF managed MOAs available to aircrews in this region were first charted decades ago and have had minimal improvements over time to meet current and evolving training requirements. The DAF is proposing regional airspace modifications to address the training shortfalls caused by the insufficient existing special use airspace to include: changing the published times of use; adjusting the horizontal dimensions of one MOA; lowering the defined floor of some MOAs to allow for additional low-altitude training in the region; and adjusting the attributes of some airspace to allow for supersonic flight below 30,000 feet mean sea level and use of chaff and flares. The Proposed Action does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment.

The special use airspace being addressed in the EIS includes several Air Force managed MOAs and their associated ATCAAs (named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby, and Fuzzy) located throughout Arizona and a small area of western New Mexico (see Enclosure 1).

The DAF is soliciting comments on three preliminary alternatives that would optimize the existing MOAs. The EIS will also evaluate a No Action Alternative per 40 CFR 1502.14 (Alternative 1). Alternative 2 includes all proposed modifications to optimize the MOAs/ATCAAs. Alternatives 3 and 4 are variations of Alternative 2. A summary of each of these is provided below, please visit the project website (www.ArizonaRegionalAirspaceEIS.com) for detailed information on these alternatives.

Alternative 1 (No Action) – airspace optimization would not occur. None of the existing MOAs/ATCAAs would be modified.

Alternative 2 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies for training aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB due to insufficient airspace. Major actions would include: changing the published times of use for the MOAs to align with current training hours; increasing the size of the Tombstone MOA/ATCAA by moving the northern boundary approximately 10 nautical miles to the north and lowering the subsonic floor to 100 feet above ground level (AGL); lowering the subsonic floor of four MOAs to 500 feet AGL (Outlaw, Jackal, Bagdad and Gladden MOAs); authorizing the use of chaff in Tombstone MOA and lowering the altitude for releasing flares in Tombstone, Outlaw, Jackal, Bagdad, and Gladden MOAs; and authorizing supersonic flight down to 5,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

Alternative 3 – optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except for increasing the size of Tombstone MOA/ATCAA by expanding the northern boundary. The subsonic floor of the Tombstone MOA would still be lowered to 100 feet AGL. Additionally, to increase the low-altitude airspace available to support Davis-Monthan AFB, the subsonic floor of Jackal MOA would be lowered to 100 feet AGL.

Alternative 4 - optimize DAF managed MOAs/ATCAAs to address existing and future training deficiencies due to insufficient airspace. Major actions would include all of those listed for Alternative 2 except that supersonic flight would be authorized down to 10,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

The DAF published a Notice of Intent to prepare the EIS in the Federal Register initiating the scoping phase of the project, which is the first opportunity for public and stakeholder involvement in the NEPA process. We request your participation and solicit your comments on the potential alternatives to the Proposed Action and information or analyses relevant to the Proposed Action. Please provide your comments no later than **March 4, 2022** to ensure consideration in the Draft EIS in accordance with 40 CFR 1503.3(b); comments submitted after this date shall be considered forfeited. Electronic comments may be submitted on the project website any time prior to the comment deadline, www.ArizonaRegionalAirspaceEIS.com. Written comments may be submitted at the in-person public meetings or by mailing to Arizona Regional Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666 (must be postmarked by **March 4, 2022**).

The DAF is hosting several in-person public meetings to provide information on the proposed action and the preliminary alternatives described above. You are invited to attend any of the public meetings listed in Enclosure 2. All of the meetings will be open-house style at each location on the date and times indicated. No formal presentation will be given, please attend at your convenience during the time designated. Project specific display posters will be staffed by Air Force representatives who will be available to answer questions. We encourage you to visit the project website at any time where you can preview all the materials that will be on display at the meetings. If you do not wish to attend an in-person meeting or are unable to do so, the project website provides a Virtual Meeting option that includes all of the same displays and information that will be available at the in-person meetings.

The environmental analysis for the Proposed Action is being conducted by the Air Force Civil Engineer Center. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs* and 36 CFR Part 800 of the National Historic Preservation Act, this letter requests consultation with your office regarding the Proposed Action. Additional information on determining the Area of Potential Effects, Identifying Historic Properties, and determining effects will be forthcoming as the analyses are completed. My point of contact for this consultation is Kevin Wakefield. He can be reached at (520) 228-4035, Kevin.Wakefield.1@us.af.mil. Please reach out should you have any questions.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Enclosures:
1. Project Area Map
2. In-person Public Meeting Locations and Schedule

Thank you for the information. At this time, we have no comments on the Proposed Action. We look forward to Section 106 consultation on this project.

Erin Davis
Arizona State Historic Preservation Office
February 7, 2022

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

27 June 2024

Mr. Christopher Brewster
Flight Chief, Installation Management
355 Civil Engineer Squadron
3775 S. Fifth Street
Davis Monthan Air Force Base, AZ 85707

Kathryn Leonard
State Historic Preservation Officer
Arizona State Historic Preservation Office
1100 W. Washington Street, #190
Phoenix, AZ 85085

SUBJECT: Request for Concurrence on Area of Potential Effects and Identification of Historic Properties for Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona (SHPO-2022-0045 [162263])

Dear Ms. Leonard

The Department of the Air Force (DAF) is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspaces (ATCAAs) to address needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action has been jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for interagency, intergovernmental coordination, and consultation. The DAF initiated consultation for this action with your office via a letter dated January 10, 2022, and appreciate your engagement on this action to date. The DAF is currently preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed modifications of MOAs and ATCAAs.

In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 Code of Federal Regulations (CFR) part 800, the DAF, Davis-Monthan AFB, is advising you of a proposed undertaking that has the potential to affect historic properties. The undertaking requires modifications of MOAs/ATCAAs that would result in modified training activities within these areas to support the DAF mission.

The purpose of the proposed undertaking is to alleviate training shortfalls and address training needs for aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB in Arizona. DAF is requesting that the Federal Aviation Administration implement modifications to existing DAF-managed MOAs, which are a type of Special Use Airspace, and associated ATCAAs. The bases in Arizona share a primary mission to train and deploy combat-ready pilots for the Air Force, Air National Guard, and Air Force Reserves. The DAF-managed MOAs in this region must support training for a variety of aircraft and missions. A MOA has defined spatial boundaries within the National Airspace System designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers and low-altitude operations. ATCAAs are not special use airspace but can support the same training activities that occur in MOAs. An ATCAA exists in higher altitudes within the National Airspace System and can be requested by the military to extend the usable training airspace. ATCAAs typically have the same horizontal boundaries of the underlying MOA and an agreed upon ceiling.

Many of the DAF managed MOAs available to aircrews in this region were first charted decades ago and have had minimal improvements over time to meet current and evolving training requirements. The special use airspace being addressed in the EIS includes 10 DAF managed MOAs and their associated high altitude ATCAAs named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby/Fuzzy located throughout Arizona and a small area of western New Mexico (Enclosure 1). The DAF has proposed modifications to address the training shortfalls caused by the insufficient existing special use airspace to include:

- Expanding the northern boundary of the Tombstone MOA/ATCAA approximately 10 nautical miles (Tombstone A, B, and C on Enclosure 1 constitutes the existing MOA) and lowering the floor of this MOA to 100 feet above ground level (AGL) (currently the floor is 500 feet AGL). This is the only MOA with proposed horizontal changes.
- Lowering the floors of Outlaw, Jackal, Bagdad, and Gladden MOAs to 500 feet AGL to allow for additional low-altitude training in the region. The floors of the Outlaw and Jackal MOAs are currently 3,000 feet AGL and the floors of the Bagdad and Gladden MOAs are currently 5,000 feet AGL. The EIS includes an alternative to lower the floor of Jackal MOA to 100 feet AGL.
- Authorizing supersonic flight below 30,000 feet mean sea level in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs/ATCAAs. The EIS analyzes two proposed altitudes: 5,000 feet AGL and 10,000 feet AGL.
- Allowing for the use of chaff in the Tombstone MOA/ATCAA (chaff is currently used in all other MOAs).
- Flares are currently used in all MOAs/ATCAAs. To align with the new proposed lower floors of Tombstone, Outlaw, Jackal, Gladden, and Bagdad MOAs, the minimum release altitude would be adjusted to the standard minimum altitude (2,000 feet AGL). Flares are designed to burn out completely within 3 to 5 seconds, during which time the flare would fall between 200 to 400 feet. The use of flares in all MOAs/ATCAAs is restricted based on local fire conditions as a best management practice.

The EIS also addresses an administrative change to the published times of use in the aeronautical charts for all 10 MOAs. The MOAs are routinely used outside of the current published times of use through notice to air missions (NOTAMs). The proposed changes to the published times would better align with how the MOAs are currently used and eliminate the administrative burden of issuing NOTAMs on a recurring basis. The proposed changes would also make the published times of use for contiguous MOAs and those that are almost always scheduled together consistent, which would improve scheduling. Adjusting the published times of use would not change the percentage of operations that occur during the nighttime; nighttime operations outside of the published times currently occurs through the NOTAM process. Changing the published times of use would be the only modification to the Sells and Ruby/Fuzzy MOAs/ATCAAs.

The undertaking does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment. Thus, the area of potential effects (APE) for this undertaking is defined as the areas underlying the horizontal boundaries of the MOAs that would be affected by the flight training activities within the modified MOAs (see Enclosure 1).

Efforts to identify historic properties within the APE for the undertaking were derived from conducting background research to identify National Register of Historic Places and the State Register of Historic Places properties beneath the affected airspace including national historic landmarks; national battlefields; national historic trails; or any cultural landscapes, recorded within the same area; and sacred areas, or traditional use areas identified through government-to-government consultation. The DAF has determined that historic properties exist within the APE (Enclosure 2).

We request your review and concurrence with the proposed APE and the DAF's level of effort to identify historic properties within the APE. Pursuant to 36 CFR §800.5(c) we will assume your concurrence if no objection is received from your office within 30 days of receipt of this letter. In addition to your office, DAF is consulting with the New Mexico State Historic Preservation Office, and 30 federally recognized Tribal Nations and Pueblos who may have cultural or historical interests in the area. Tribal consultations were also initiated in the January 2022 timeframe and have been ongoing with responsive tribes to the extent practicable since that time. Correspondence with all tribes will be initiated again concurrent with release of the Draft EIS in the late Summer 2024 timeframe.

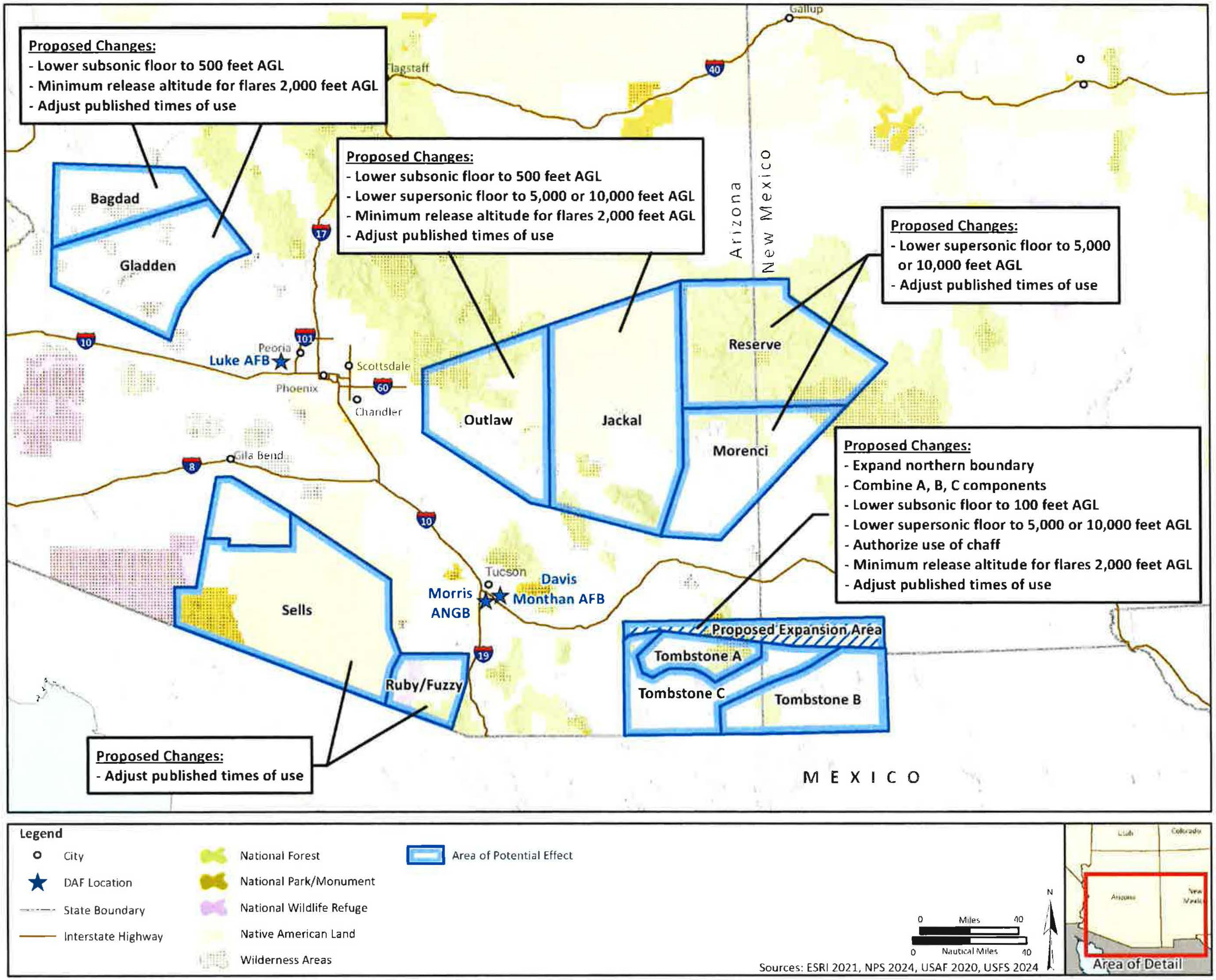
Should you or your staff have any questions or concerns please contact my point of contact for this consultation, Barbara Long. She can be reached at (520) 228-4035, barbara.long.3@us.af.mil. Please reach out should you have any questions.

Sincerely

BREWSTER.CHRISTOPHER.L.1387925305 Digitally signed by BREWSTER.CHRISTOPHER.L.1387925305 Date: 2024.06.27 07:44:14 -07'00'

CHRISTOPHER L. BREWSTER, PE, GS-14, DAFC
Flight Chief, Installation Management

Enclosures:
1. APE for Special Use Airspace Optimization to Support Air Force Missions in Arizona
2. Identification of Historic Properties


Proposed Changes:
- Lower subsonic floor to 500 feet AGL
- Minimum release altitude for flares 2,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Lower subsonic floor to 500 feet AGL
- Lower supersonic floor to 5,000 or 10,000 feet AGL
- Minimum release altitude for flares 2,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Lower supersonic floor to 5,000 or 10,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Expand northern boundary
- Combine A, B, C components
- Lower subsonic floor to 100 feet AGL
- Lower supersonic floor to 5,000 or 10,000 feet AGL
- Authorize use of chaff
- Minimum release altitude for flares 2,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Adjust published times of use
Bagdad
Gladden
Outlaw
Jackal
Reserve
Morenci
Sells
Ruby/Fuzzy
Proposed Expansion Area
Tombstone A
Tombstone C
Tombstone B
Gallup
Flagstaff
Peoria
Luke AFB
Scottsdale
Phoenix
Chandler
Gila Bend
Tucson
Morris ANGB
Davis Monthan AFB
Arizona
New Mexico
MEXICO
40
17
10
101
60
8
19
Legend
City
DAF Location
State Boundary
Interstate Highway
National Forest
National Park/Monument
National Wildlife Refuge
Native American Land
Wilderness Areas
Area of Potential Effect
0 Miles 40
0 Nautical Miles 40
N
Sources: ESRI 2021, NPS 2024, USAF 2020, USFS 2024
Area of Detail

Enclosure 2
Identification of Historic Properties (36 CFR § 800.4(b))

Tombstone MOA/ATCAA

There are two archaeological sites and 27 architectural sites listed in the NRHP that are located beneath the existing and proposed Tombstone Military Operations Areas (MOAs) / Air Traffic Control Assigned Airspace (ATCAA) (Table 1). The archaeological sites consist of a cemetery and the location where Geronimo surrendered (National Park Service [NPS] 2022a). The architectural sites consist of three houses, six historic districts, one hotel, two churches, one airport, one underpass, one theatre, two United States (U.S.) Forest Service (USFS) lookout cabins/lookout complex, three USFS ranger stations, one Young Men's Christian Association (YMCA) building, one railroad passenger depot, three buildings associated with border patrol, one clubhouse, and one general store (NPS 2022a).

Table 1. NRHP-Listed Archaeological and Architectural Sites Beneath Existing and Proposed Tombstone MOAs/ATCAA

Resource Identification	County	City/Town
Archaeological		
Evergreen Cemetery	Cochise	Bisbee
Geronimo Surrender Site	Cochise	Douglas
Architectural		
Barfoot Lookout Complex*	Cochise	Portal
Bisbee Historic District	Cochise	Bisbee
Bisbee Residential Historic District	Cochise	Bisbee
Bisbee Woman's Club Clubhouse	Cochise	Bisbee
Camp Naco Historic District	Cochise	Naco
Cima Park Fire Guard Station	Cochise	Douglas
Douglas Historic District	Cochise	Douglas
Douglas Municipal Airport	Cochise	Douglas
Douglas Residential Historic District	Cochise	Douglas
Douglas Sonoran Historic District	Cochise	Douglas
Douglas Underpass	Cochise	Douglas
Douglas, Walter, House	Cochise	Bisbee
El Paso and Southwestern Railroad Passenger Depot--Douglas	Cochise	Douglas
El Paso and Southwestern Railroad YMCA	Cochise	Douglas
Gasden Hotel	Cochise	Douglas
Grand Theatre	Cochise	Douglas
Monte Vista Lookout Cabin	Cochise	Elfrida
Muheim House	Cochise	Bisbee
Naco Border Station	Cochise	Naco
Our Lady of Victory Catholic Church	Cochise	Pearce
Pearce General Store	Cochise	Pearce
Portal Ranger Station*	Cochise	Portal

Table 1. NRHP-Listed Archaeological and Architectural Sites Beneath Existing and Proposed Tombstone MOAs/ATCAA		
Resource Identification	**County**	**City/Town**
Rustler Park Fire Guard Station*	Cochise	Douglas
St. Patrick's Roman Catholic Church	Cochise	Bisbee
Treu, John, House	Cochise	Bisbee
U.S. Inspection Station--Douglas, Arizona	Cochise	Douglas
U.S. Post Office and Customs House--Douglas Main	Cochise	Douglas

Source: NPS 2022a.
Notes: *Sites located within the Proposed Tombstone MOA/ATCAA expansion; however, these sites have been exposed to overflights due to their location beneath Playas MOA.

Three National Historic Landmarks are located beneath the existing Tombstone MOAs/ATCAA: Phelps Dodge General Office Building, San Bernardino Ranch, and Double Adobe Site (NPS 2022b). The Phelps Dodge General Building was the headquarters for the Phelps Dodge mining company between 1896 to 1961 and currently houses the Bisbee Mining and Historical Museum (Landmark Hunter 2021). The San Bernardino Ranch is the site of two historic cattle ranches that straddled the U.S. and Mexico border (NPS 2021a). The Double Adobe Site is an archaeological site located in the Whitewater Draw area in southern Arizona.

Outlaw and Jackal MOAs/ATCAAs

There are two archaeological sites and 66 architectural sites listed in the NRHP beneath the existing Outlaw and Jackal MOAs/ATCAAs (Table 2). The archaeological sites consist of a prehistoric Salado masonry pueblo and a holy cross (NPS 2022a). The architectural sites consist of 1 dam, 12 bridges, 3 hotels, 2 schools, 4 churches, 4 historic districts, 1 bank, 3 courthouses, 4 buildings, 1 railroad depot, 1 pueblo, 22 houses, 3 USFS lookout towers/lookout complex, 1 USFS ranger station, 1 mine rescue station, 1 depression-era USFS work station, 1 arboretum, and charcoal ovens (NPS 2022a).

Table 2. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Outlaw and Jackal MOAs/ATCAAs		
Resource Identification	**County**	**City/Town**
Archaeological		
Besh-Ba-Gowah	Gila	Globe
La Santa Cruz de Globe	Gila	Globe
Architectural		
Bingham, Richard, House	Graham	Safford
Black River Bridge	Gila	Carrizo
Bonita Store	Graham	Bonita
Brooks, Paul, House	Graham	Safford
Buena Vista Hotel	Graham	Safford
Bullion Plaza School	Gila	Miami
Butte-Cochran Charcoal Ovens	Pinal	Florence

Table 2. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Outlaw and Jackal MOAs/ATCAAs		
Resource Identification	**County**	**City/Town**
Caldwell, Erskine P., House	Pima	Tucson
Columbine Work Station	Graham	Safford
Coolidge Dam	Gila	San Carlos
Cordova Avenue Bridge	Gila	Miami
Cross, T. D., House	Graham	Safford
Davis, William Charles, House	Graham	Safford
Devil's Canyon Bridge	Pinal	Superior
Dominion Hotel	Gila	Globe
Eleven Arches, The	Pima	Tucson
Elks Building	Gila	Globe
Fort Apache Historic District	Navajo	Whiteriver
Gabel House	Pima	Tucson
Gila County Courthouse	Gila	Globe
Gila Pueblo	Gila	Globe
Gila Valley Bank and Trust Building	Gila	Globe
Globe Downtown Historic District	Gila	Globe
Globe Mine Rescue Station	Gila	Globe
Graham County Courthouse	Graham	Safford
Heliograph Lookout Complex	Graham	Old Columbine
Holy Angels Church	Gila	Globe
Horowitz, Joe, House	Graham	Safford
House at 611 Third Avenue	Graham	Safford
Inspiration Avenue Bridge	Gila	Miami
International House	Gila	Globe
Kelvin Bridge	Pinal	Kelvin
Keystone Avenue Bridge	Gila	Miami
McPherson Magma Hotel	Pinal	Superior
Miami Avenue Bridge	Gila	Miami
Miami Community Church	Gila	Miami
Mineral Creek Bridge	Pinal	Kelvin
North Central Avenue Streetscape Historic District	Maricopa	Phoenix
O'Brien, Mathew, House	Graham	Safford
Oddfellows Home	Graham	Safford
Olney, George A., House	Graham	Safford
Our Lady of the Blessed Sacrament Church	Gila	Miami
Packer, Alonzo Hamilton, House	Graham	Safford
Pinal Ranger Station	Gila	Globe
Queen Creek Bridge	Pinal	Florence Junction
Reppy Avenue Bridge	Gila	Miami

Table 2. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Outlaw and Jackal MOAs/ATCAAs		
Resource Identification	**County**	**City/Town**
Ridgeway, David, House	Graham	Safford
Rillito Race Track Historic District	Pima	Tucson
Safford High School	Graham	Safford
Salt River Bridge	Gila	Roosevelt
Soderman Building	Gila	Miami
Southern Pacific Railroad Depot	Graham	Safford
St. John's Episcopal Church	Gila	Globe
Talley, Hugh, House	Graham	Safford
Talley, William, House	Graham	Safford
Theodore Roosevelt Dam National Register District	Gila	Roosevelt
Boyce Thompson, Southwestern Arboretum	Pinal	Superior
U.S. Post Office and Courthouse--Globe Main	Gila	Globe
Webb Peak Lookout Tower	Graham	Old Columbine
Welker, James R., House	Graham	Safford
West Peak Lookout Tower	Graham	Bonita
Wickersham, David, House	Graham	Safford
Williams, Dan, House	Graham	Safford
Wilson, J. Mark, House	Graham	Safford
Winkelman Bridge	Pinal	Winkelman
Woman's Club	Graham	Safford

Source: NPS 2022a.

Two Arizona State Register of Historic Places sites, Freeman Homestead Ruins and Lime Kilns, are located within the Saguaro National Park beneath the existing Outlaw and Jackal MOAs/ATCAAs (Arizona State Parks 2023).

Three National Historic Landmarks are located beneath the existing Outlaw and Jackal MOAs/ATCAAs, Kinishba Ruins, Fort Apache and Theodore Roosevelt School, and Sierra Bonita Ranch (NPS 2022b). The Kinishba Ruins is located west of Fort Apache Indian Reservation and consists of nine masonry buildings constructed between 1250 and 1350 A.D. by the pre-Columbian Mogollon culture (NPS 2023a). Fort Apache was a crucial link in the chain of forts supporting the U.S. military effort in the southwest. It was later used as a recruitment center for young Native American men that enlisted to serve as translators and de facto military police and was later used for the African American regiments that served on the western frontier. In the 1920s the Fort Apache was transformed into the Theodore Roosevelt School, which was a boarding and day school run by the Bureau of Indian affairs (Erickson et al. 2024). Sierra Bonita Ranch was the first permanent American cattle ranch in Arizona (NPS 2021b).

The *Chi'chil Bildagoteel* (Oak Flat) Historic District Traditional Cultural Property is located on the Tonto National Forest beneath the existing Outlaw and Jackal MOAs/ATCAAs. *Chi'chil*

Bildagoteel is a sacred site and ancestral homeland to the Western Apache Indians (Nez 2014). Government-to-government consultation with Federally recognized Tribes and Pueblos to date have not identified any other traditional cultural properties associated with the lands under the existing Outlaw and Jackal MOAs/ATCAAs.

Gladden and Bagdad MOAs/ATCAAs

There is one archaeological site and three architectural sites listed in the NRHP beneath the existing Gladden and Bagdad MOAs/ATCAAs (Table 3). The archaeological site consists of the ruins of a U.S. Army post and the architectural sites consist of one house, one school, and an observatory (NPS 2022a).

Table 3. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Gladden and Bagdad MOAs/ATCAAs

Resource Identification	County	City/Town
Archaeological		
Camp Date Creek	Yavapai	Date Creek
Architectural		
Harquahala Peak Observatory	La Paz	Wenden
Nohlechek, Rhoda, House	Maricopa	Wenden
Peeples Valley School	Yavapai	Peeples Valley

Source: NPS 2022a.

During government-to-government consultation with Federally recognized Tribal Nations and Pueblos, the Moapa Band of Paiutes identified the "Salt Song Trail," a cultural landscape, located on lands under the existing Gladden and Bagdad MOAs/ATCAAs. The Salt Song Trail is described as a Songscape (Cry Song) of Traditional Ecological Knowledge of the afterlife journey trail going through Southern Nevada, Southern Utah, Northern Arizona, and Southern California. The Salt Song Trail is a cultural landscape that is an important part of their heritage, cultural, traditions, and holistic approach to the Southern Paiutes still practicing songs today and includes all of these lands (Native Land 2023).

Morenci MOA/ATCAA

There is one archaeological site and eight architectural sites listed in the NRHP beneath the existing Morenci MOA/ATCAA in Arizona (Table 4). The archaeological site consists of the ruins of a U.S. Army post and the architectural sites consist of two houses, three bridges, one road overpass, one building, and one historic district (NPS 2022a).

Table 4. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Morenci MOA/ATCAA

Resource Identification	County	City/Town
Archaeological		
Kearny Campsite and Trail	Graham	Safford
Architectural		

Table 4. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Morenci MOA/ATCAA		
Resource Identification	**County**	**City/Town**
Billingsley, Benjamin F., House	Duncan	Greenlee
Black Gap Bridge	Clifton	Greenlee
Clifton Casa Grande Building	Clifton	Greenlee
Clifton Townsite Historic District	Clifton	Greenlee
Gila River Bridge	Clifton	Greenlee
Park Avenue Bridge	Clifton	Greenlee
Potter, Dell, Ranch House	Clifton	Greenlee
Solomonville Road Overpass	Safford	Greenlee

Source: NPS 2022a.

One National Historic Landmark, Point of Pines, is located beneath the existing Morenci MOA/ATCAA (NPS 2022b). Point of Pines is a set of archaeological sites located on the San Carlos Apache Indian Reservation. This National Historic Landmark is significant due to its associations with the Ancestral Pueblo, Mogollon, and Hohokam cultures.

Reserve MOA/ATCAA

There are no archaeological sites and three architectural sites listed in the NRHP beneath the existing Reserve MOA/ATCAA in Arizona (Table 5). The architectural sites consist of one school and two USFS lookout complexes (NPS 2022a).

Table 5. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Reserve MOA/ATCAA		
Resource Identification	**County**	**City/Town**
Architectural		
Alpine Elementary School	Apache	Alpine
Bear Mountain Lookout Complex	Greenlee	Mogollon Rim
PS Knoll Lookout Complex	Apache	Maverick

Source: NPS 2022a.

During government-to-government consultation with Federally recognized Tribes and Pueblos, the White Mountain Apache Tribe identified Mount Baldy as a traditional cultural property located on the land under the existing Reserve MOA/ATCAA.

Ruby and Fuzzy MOA/ATCAA

There are no archaeological sites and two architectural sites listed in the NRHP beneath the existing Ruby and Fuzzy MOA/ATCAA (Table 6). The architectural sites consist of one school and a historic town (NPS 2022a).

Table 6. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Ruby and Fuzzy MOA/ATCAA		
Resource Identification	**County**	**City/Town**
Architectural		
Arivaca Schoolhouse	Pima	Arivaca
Town of Ruby	Santa Cruz	Ruby and Vicinity

Source: NPS 2022a.

Sells MOA/ATCAA

There are five archaeological sites and six architectural sites listed in the NRHP beneath the existing Sells MOA/ATCAA (Table 7). The archaeological sites consist of one multi-component site, three historic mines, and a mountain peak (NPS 2022a) within the Organ Pipe Cactus National Monument that is sacred to the Tohono O'odham Nation and non-federally recognized Hia C-ed O'odham, which is represented by the Tohono O'odham Nation. Tribal Nations (NPS 1994b). The architectural sites consist of one school, one house, two ranches, one historic district (Ajo Townsite), and a pre-contact/post-contact 250-mile trail known as the El Camino del Diablo (NPS 2022a). While the overall length of the El Camino del Diablo is 250 miles, only a small portion is located under the Sells MOA.

Table 7. NRHP-Listed Archaeological and Architectural Sites Beneath Existing Sells MOA/ATCAA		
Resource Identification	**County**	**City/Town**
Archaeological		
Bull Pasture	Pima	Lukeville
Growler Mine Area	Pima	Lukeville
I'itoi Mo'o--Montezuma's Head and 'Oks Daha--Old Woman Sitting[#]	Pima	Ajo
Milton Mine	Pima	Lukeville
Victoria Mine	Pima	Lukeville
Architectural		
Ajo Townsite Historic District	Pima	Ajo
Bates Well Ranch	Pima	Ajo
Curley School	Pima	Ajo
Dos Lomitas Ranch	Pima	Ajo
Greenway, John and Isabella, House	Pima	Ajo

Source: NPS 2022a.
Notes: [#]Traditional Cultural Property.

One National Historic Monument, Organ Pipe Cactus National Monument, is located beneath the existing Sells MOA/ATCAA (NPS 2023c). The Organ Pipe Cactus National Monument consists of many Hohokam culture archaeological sites and is the only place in the U.S. where the senita and organ pipe cactus grow wild (NPS 2018).

Ventana Cave, a National Historic Landmark is located beneath the existing Sells MOA/ATCAA (NPS 2022b). Ventana Cave is located on the Tohono O'odham Indian Reservation.

A known archaeological site, *I'itoi Mo'o* (Montezuma's Head) and *'Oks Daha* (Old Woman Sitting) is a traditional cultural property located on lands under the existing Sells MOA/ATCAA. This site is used by the Tohono O'odham Nation and non-federally recognized Hia-Ced O'odham which is represented by the Tohono O'odham Nation for ceremonial purposes and to worship *I'itoi* (NPS 1994b). Government-to-government consultation with Federally recognized Tribal Nations and Pueblos to date have not identified any other traditional cultural properties associated with the lands under the existing Sells MOA/ATCAA.

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

27 June 2024

Mr. Christopher Brewster
Flight Chief, Installation Management
355 Civil Engineer Squadron
3775 S. Fifth Street
Davis Monthan Air Force Base, AZ 85707

Dr. Jeff Pappas
State Historic Preservation Officer
New Mexico Historic Preservation Division
407 Galisteo Street, Suite 236
Santa Fe, NM 87501

SUBJECT: Request for Concurrence on Area of Potential Effects and Identification of Historic Properties for Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona (HPD Log#116581)

Dear Dr. Pappas

The Department of the Air Force (DAF) is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspaces (ATCAAs) to address needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action has been jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for interagency, intergovernmental coordination, and consultation. The DAF initiated consultation for this action with your office via a letter dated January 10, 2022, and appreciate your engagement on this action to date. The DAF is currently preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed modifications of MOAs and ATCAAs.

In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 Code of Federal Regulations (CFR) part 800, the DAF, Davis-Monthan AFB, is advising you of a proposed undertaking that has the potential to affect historic properties. The undertaking requires modifications of MOAs/ATCAAs that would result in modified training activities within these areas to support the DAF mission.

The purpose of the proposed undertaking is to alleviate training shortfalls and address training needs for aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB in Arizona. DAF is requesting that the Federal Aviation Administration implement modifications to existing DAF-managed MOAs, which are a type of Special Use Airspace, and associated ATCAAs. The bases in Arizona share a primary mission to train and deploy combat-ready pilots for the Air Force, Air National Guard, and Air Force Reserves. The

DAF-managed MOAs in this region must support training for a variety of aircraft and missions. A MOA has defined spatial boundaries within the National Airspace System designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers and low-altitude operations. ATCAAs are not special use airspace but can support the same training activities that occur in MOAs. An ATCAA exists in higher altitudes within the National Airspace System and can be requested by the military to extend the usable training airspace. ATCAAs typically have the same horizontal boundaries of the underlying MOA and an agreed upon ceiling.

Many of the DAF managed MOAs available to aircrews in this region were first charted decades ago and have had minimal improvements over time to meet current and evolving training requirements. The special use airspace being addressed in the EIS includes 10 DAF managed MOAs and their associated high altitude ATCAAs named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby/Fuzzy located throughout Arizona and a small area of western New Mexico (Enclosure 1). The DAF has proposed modifications to address the training shortfalls caused by the insufficient existing special use airspace to include:

- Expanding the northern boundary of the Tombstone MOA/ATCAA approximately 10 nautical miles (Tombstone A, B, and C on Enclosure 1 constitutes the existing MOA) and lowering the floor of this MOA to 100 feet above ground level (AGL) (currently the floor is 500 feet AGL). This is the only MOA with proposed horizontal changes.
- Lowering the floors of Outlaw, Jackal, Bagdad, and Gladden MOAs to 500 feet AGL to allow for additional low-altitude training in the region. The floors of the Outlaw and Jackal MOAs are currently 3,000 feet AGL and the floors of the Bagdad and Gladden MOAs are currently 5,000 feet AGL. The EIS includes an alternative to lower the floor of Jackal MOA to 100 feet AGL.
- Authorizing supersonic flight below 30,000 feet mean sea level in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs/ATCAAs. The EIS analyzes two proposed altitudes: 5,000 feet AGL and 10,000 feet AGL.
- Allowing for the use of chaff in the Tombstone MOA/ATCAA (chaff is currently used in all other MOAs).
- Flares are currently used in all MOAs/ATCAAs. To align with the new proposed lower floors of Tombstone, Outlaw, Jackal, Gladden, and Bagdad MOAs, the minimum release altitude would be adjusted to the standard minimum altitude (2,000 feet AGL). Flares are designed to burn out completely within 3 to 5 seconds, during which time the flare would fall between 200 to 400 feet. The use of flares in all MOAs/ATCAAs is restricted based on local fire conditions as a best management practice.

The EIS also addresses an administrative change to the published times of use in the aeronautical charts for all 10 MOAs. The MOAs are routinely used outside of the current published times of use through notice to air missions (NOTAMs). The proposed changes to the published times would better align with how the MOAs are currently used and eliminate the administrative burden of issuing NOTAMs on a recurring basis. The proposed changes would also make the published times of use for contiguous MOAs and those that are almost always scheduled together consistent, which would improve scheduling. Adjusting the published times of use would not change the percentage of operations that occur during the nighttime; nighttime operations outside of the published times currently occur through the NOTAM process. Changing the published times of use would be the only modification to the Sells and Ruby/Fuzzy MOAs/ATCAAs.

The undertaking does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment.

Thus, the area of potential effects (APE) for this undertaking is defined as the areas underlying the horizontal boundaries of the MOAs that would be affected by the flight training activities within the modified MOAs (see Enclosure 1).

Efforts to identify historic properties within the APE for the undertaking were derived from conducting background research to identify National Register of Historic Places and the State Register of Historic Places properties beneath the affected airspace including national historic landmarks; national battlefields; national historic trails; or any cultural landscapes, recorded within the same area; and sacred areas, or traditional use areas identified through government-to-government consultation. The DAF has determined that historic properties exist within the APE (Enclosure 2).

We request your review and concurrence with the proposed APE and the DAF's level of effort to identify historic properties within the APE. Pursuant to 36 CFR §800.5(c) we will assume your concurrence if no objection is received from your office within 30 days of receipt of this letter. In addition to your office, DAF is consulting with the Arizona State Historic Preservation Office, and 30 federally recognized Tribal Nations and Pueblos who may have cultural or historical interests in the area. Tribal consultations were also initiated in the January 2022 timeframe and have been ongoing with responsive tribes to the extent practicable since that time. Correspondence with all tribes will be initiated again concurrent with release of the Draft EIS in the late Summer 2024 timeframe.

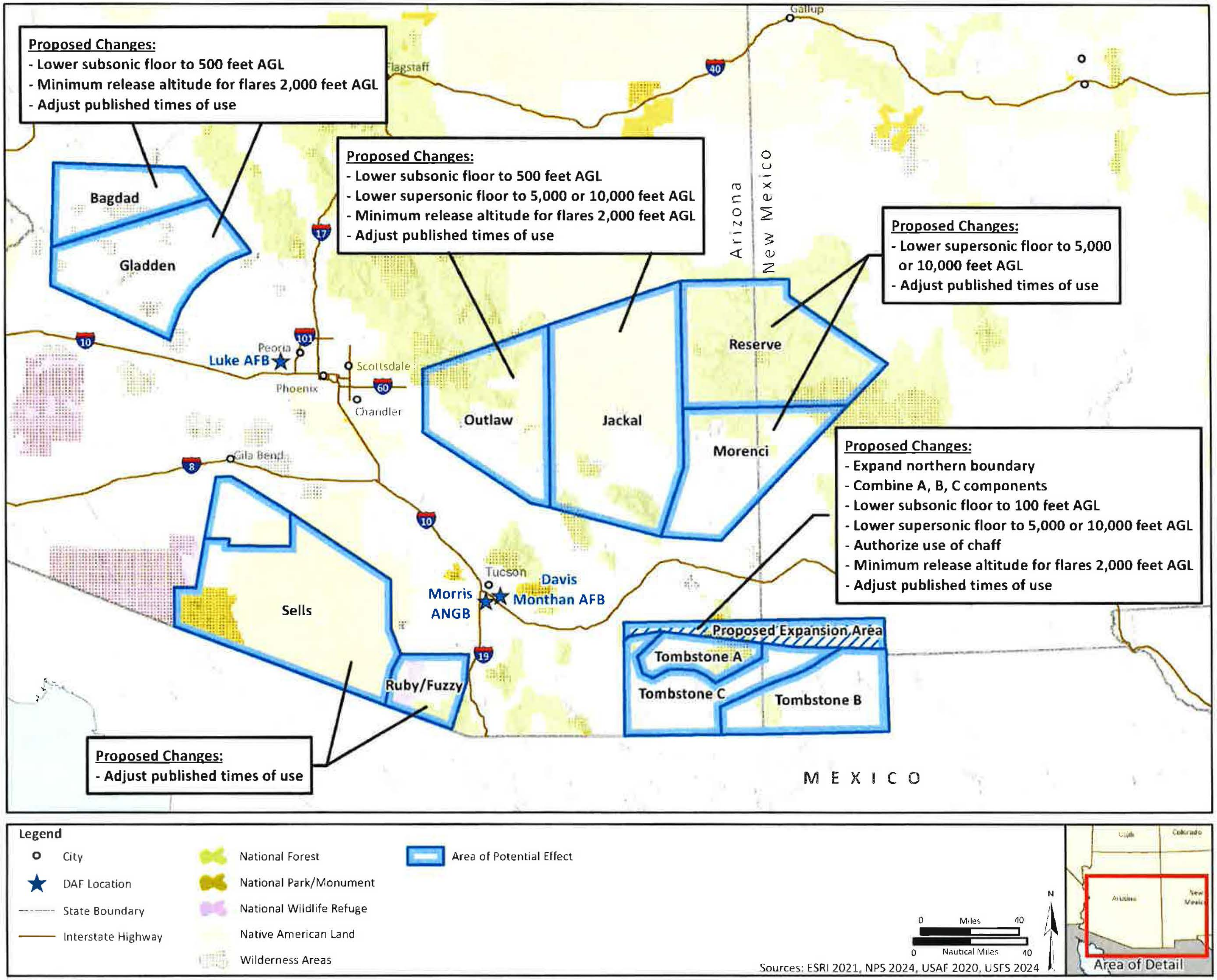
Should you or your staff have any questions or concerns please contact my point of contact for this consultation, Barbara Long. She can be reached at (520) 228-4035, barbara.long.3@us.af.mil. Please reach out should you have any questions.

Sincerely

BREWSTER.CHRISTOPHER.L.1387925305 Digitally signed by BREWSTER.CHRISTOPHER.L.1387925305 Date: 2024.06.27 07:45:15 -07'00'

CHRISTOPHER L. BREWSTER, PE, GS-14, DAFC
Flight Chief, Installation Management

Enclosures:
1. APE for Special Use Airspace Optimization to Support Air Force Missions in Arizona
2. Identification of Historic Properties


Proposed Changes:
- Lower subsonic floor to 500 feet AGL
- Minimum release altitude for flares 2,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Lower subsonic floor to 500 feet AGL
- Lower supersonic floor to 5,000 or 10,000 feet AGL
- Minimum release altitude for flares 2,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Lower supersonic floor to 5,000 or 10,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Expand northern boundary
- Combine A, B, C components
- Lower subsonic floor to 100 feet AGL
- Lower supersonic floor to 5,000 or 10,000 feet AGL
- Authorize use of chaff
- Minimum release altitude for flares 2,000 feet AGL
- Adjust published times of use
Proposed Changes:
- Adjust published times of use
Gallup
Flagstaff
Arizona
New Mexico
Bagdad
Gladden
Reserve
Outlaw
Jackal
Morenci
Luke AFB
Peoria
Scottsdale
Phoenix
Chandler
Gila Bend
Tucson
Davis Monthan AFB
Morris ANGB
Sells
Ruby/Fuzzy
Proposed Expansion Area
Tombstone A
Tombstone B
Tombstone C
MEXICO
Legend
City
DAF Location
State Boundary
Interstate Highway
National Forest
National Park/Monument
National Wildlife Refuge
Native American Land
Wilderness Areas
Area of Potential Effect
N
0 Miles 40
0 Nautical Miles 40
Sources: ESRI 2021, NPS 2024, USAF 2020, USFS 2024
Area of Detail

Enclosure 2
Identification of Historic Properties (36 CFR § 800.4(b))

Tombstone MOA/ATCAA

There are no NRHP listed sites or New Mexico State Register of Historic Places located beneath the existing and proposed Tombstone MOAs/ATCAAs in New Mexico (NPS 2022; New Mexico Historic Preservation Division 2021).

Morenci MOA/ATCAA

There are no NRHP listed sites or New Mexico State Register of Historic Places located beneath the existing and proposed Morenci MOA/ATCAA in New Mexico (NPS 2022; New Mexico Historic Preservation Division 2021).

Reserve MOA/ATCAA

There are no archaeological sites and four architectural sites listed in the NRHP beneath the existing Reserve MOA/ATCAA in New Mexico (**Table 1**). The architectural sites consist of one USFS lookout cabin, USFS lookout cabins and shed, a mining company mill, and a historic district (NPS 2022). The architectural sites are also listed in the New Mexico State Register of Historic Places (New Mexico Historic Preservation Department 2021).

Table 1. NRHP-Listed Architectural Sites Beneath Existing Reserve MOA/ATCAA

Resource Identification	**County**	**City/Town**
Architectural		
Bearwallow Mountain Lookout Cabins and Shed	Catron	Bearwallow Park
Mogollon Baldy Lookout Cabin	Catron	Mogollon Baldy Peak
Mogollon Historic District	Catron	Mogollon
Socorro Mines Mining Company Mill, Fannie Hill	Catron	Mogollon

Source: NPS 2022.

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No.	Tribe Name	SCOPING PHASE Original Section 106 Letter (email)	Follow-up Attempt #1 (email)	Follow-up Attempt #2 (hard copy mailed)	Follow-up Attempt #3 (email)	Amended Notice of Intent Letter (hard copy mailed)	Amended Notice of Intent Letter (email)	Tribe Response	CONSULTATION STATUS
1	Ak-Chin Indian Community	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
2	Chemehuevi Indian Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
3	Cocopah Indian Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
4	Colorado River Indian Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
5	Fort McDowell Yavapai Nation	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
6	Fort Mojave Indian Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
7	Fort Sill Apache Tribe of Oklahoma	1/20/2022	2/14/2022	n/a	n/a	5/2/2022	5/9/2022	1/21/2022: Response from Michael Darrow, stated there is a new chairman and provided her email contact. 1/24/2022: DAF (Kevin Wakefield) sent Mr. Darrow copies of the Jackal-Outlaw-Morenci-Reserve MOAs and the Tombstone MOA scoping fact sheets. Also asked for email addresses for Harry W. Basehart and Morris E. Opler.	ONGOING
8	Gila River Indian Community	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	4/12/2022: Email received from Mr. Benallie Jr., acknowledged receipt of our request for G2G consultation under Section 106, look forward to reviewing EIS document(s) as they become available.	ONGOING
9	Havasupai Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
10	Hopi Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
11	Hualapai Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
12	Jicarilla Apache Nation of New Mexico	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
13	Kaibab Band of Paiute Indians	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
14	Kickapoo Tribe of Oklahoma	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	4/12/2022 emails not deliverable to: Chairman Elozondo or Pam Wesly. 11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
15	Mescalero Apache Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	8/3/2022: DAF (Kevin Wakefield) called and emailed Ms. Houghton; left message. 11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING

16	Moapa Band of Paiute Indians	1/20/2022	2/14/2022	3/10/2022	n/a	5/2/2022	5/9/2022	3/30/2022: Email received from Darren Daboda THPO expressing concerns about noise pollution disturbing the pathway songscape of the "Salt Song Trail". They would also like to review and comment on Class III Cultural Inventory Report and be notified of any Unanticipated Discoveries. 3/30/2022: DAF (Kevin Wakefield) email response indicated he has watched the video found on the Nativeland.org web site. Requested an electronic copy of the map showing the Salt Song Trail and if there are specific times of year the Salt Song is sung. Also indicated that since no ground disturbing activities are associated with this project a Class III Cultural Inventory Report has not been generated. 11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
17	Navajo Nation	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	4/29/2022: Email received Dr. Shebala establishing contact.	ONGOING
18	Paiute Indian Tribe of Utah (Cedar Band of Paiutes, Kanosh Band of Paiutes, Koosharem Band of Paiutes, Indian Peaks Band of Paiutes, and Shivwits Band of Paiutes)	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
19	Pascua Yaqui Tribe	1/20/2022	2/14/2022	n/a	n/a	5/2/2022	5/9/2022	1/20/2022: Email response requesting additional information on changes to Ruby, Fuzzy, and Tombstone MOAs. 1/24/2022: DAF response (Kevin Wakefield) to Dr. Hoerig, attached copies of the Sells, Ruby, Fuzzy MOAs Fact Sheet and the Tombstone MOA Fact Sheet. 1/24/2022: Email response from Dr. Hoerig with the following questions: 1) Does the Air Force modify flight altitudes over the designated Wilderness Areas that are indicated within the zones? 2) Does the "exclusion area" in the southwest portion of the Tombstone zone indicate that training flights will not use that area? 1/31/2022: DAF response (Kevin Wakefield) with the following answers: 1) The Arizona Desert Wilderness Act of 1990 that established these Wilderness areas includes provisions that do expressly allow for low level overflight of military aircraft in those areas. This proposal includes lowering the operational floor for subsonic and supersonic operations in the Tombstone MOA. No changes to these operational floors are proposed for Ruby or Fuzzy MOAs. 2) The current exclusion area in Tombstone MOA exists to avoid impacts to operations at Douglas and Bisbee airports. Aircrew training in the exclusion area does not occur below 13,000 ft mean sea level (MSL). Military and civilian overflights occur in this area as part of the terminal procedures at Libby, Douglas and Bisbee airports. 11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
20	Pueblo of Zuni	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING

21	Fort Yuma Quechan Indian Tribe	1/20/2022	2/14/2022	n/a	n/a	5/2/2022	5/9/2022	1/20/2022: DAF email rejected. 1/20/2022: DAF sent email to Jordan Joaquin via executive secretary, Manfred Scott, and Mrs. H. Jill McCormick. 1/33/2022: Received email from the THPO stating that they have no comment on this project and that they will defer to the more local tribes and support their decisions on the project. 11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
22	Salt River Pima-Maricopa Indian Community	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
23	San Carlos Apache Tribe	1/20/2022	2/14/2022	n/a	n/a	5/2/2022	5/9/2022	3/4/2022: Received letter with concerns (fire risk) and request for consultation. 11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
24	San Juan Southern Paiute Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
25	Tohono O’odham Nation	1/20/2022	2/14/2022	n/a	n/a	5/2/2022	5/9/2022	2/15/2022: Email response from Mr. Steere asking for maps showing routes over the Tohono O’odham Nation and any changes in flight elevations and speed. 2/15/2022: DAF email (Kevin Wakefield) provided posters (that include maps) for the Sells, Ruby, and Fuzzy MOAs, and the overview poster: MOAs Proposed for Optimization. Also let him know about the interactive map on the project web site. 2/18/2022: Received thank you email from Mr. Steere. 2/23/2022: Received email from Mr. Steere requesting to schedule a meeting with the Tohono O'odham Nation to review the planned changes. 3/2/2022: DAF (Kevin O'Berry) reached out the Tohono O'odham Nation Leaderships Administrative Assistant to schedule the meeting. 3/4/2022: Received letter from Chairman Norris, Jr., 6/23/2022: DAF (56 FW/CC, Brig Gen Kreuder) and Tohono O'odham Nation Chairman Norris met via ZoomGov.com from 11:00a - 12:20p. A lot of information was exchanged and the Nation asked to meet again in July 2022. 7/22/2022: DAF and Tohono O'odham in person meeting hosted by Brig Gen Kreuder at Luke AF and included several Nation representatives. 11/8/2023: K. Wakefield, B. Long provided update on project during Davis-Monthan AFB Annual Tribal Summit.	ONGOING
26	Tonto Apache Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING
27	Ute Mountain Ute Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	No response	ONGOING

28	White Mountain Apache Tribe	1/20/2022	2/14/2022	n/a	n/a	5/2/2022	5/9/2022	1/27/2022: Letter received from Mr. Mark Altaha, stating "we've determined the Special Use Airspace Optimization plans will have "No Adverse Effected" to the tribe's cultural heritage resources and/or traditional cultural properties, and we further support the United States Air Force missions in Arizona." 3/4/2022: Letter from Chairwoman Lee-Gatewood with supplemental comments and requesting a face-to-face meeting. 8/4/2022: DAF and White Mountain Apache Teams meeting. Discussed noise sensitive areas for avoidance to include eagle nesting areas. DAF provided map to Tribe and representatives can review and provide updates. Also discussed avoidance for several populated areas. Tribe identified Mount Baldy as a TCP. The tribal leadership requested an in person meeting to discuss the project.	ONGOING
29	Yavapai-Apache Nation	1/20/2022	2/14/2022	n/a	n/a	5/2/2022	5/9/2022	1/20/2022: Email response, no issues identified, deferred consultations to White Mountain and San Carlos Apache Tribes.	ONGOING
30	Yavapai-Prescott Indian Tribe	1/20/2022	2/14/2022	3/10/2022	4/12/2022	5/2/2022	5/9/2022	4/14/2022: Email response from Greg Glassco and Ms. Ogo, requested to be kept informed as the project is being completed and additional document is available for review.	ONGOING

January 10, 2022

Ak-Chin Indian Community
Attn: Mr. Robert Miguel
Chairman
42507 W. Peters & Nall Rd
Maricopa, AZ 85138

FROM: 355 WG/CC

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Mr. Miguel:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), the Department of the Air Force (DAF) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona. The DAF is proposing to modify existing Air Force managed Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAA) to address training needs for aircrews stationed at Davis-Monthan Air Force Base (AFB), Luke AFB, and Morris Air National Guard Base (ANGB) in Arizona. This regional action is being jointly proposed by leadership at all three DAF installations, but Davis-Monthan AFB is serving as the lead proponent for this consultation.

A MOA is a type of special use airspace with defined spatial boundaries within the National Airspace System designated to contain non-hazardous, military flight activities, such as basic air combat maneuvers and low-altitude operations. ATCAAs are not special use airspace but can support the same training activities that occur in MOAs. An ATCAA exists in higher altitudes within the National Airspace System and can be requested by the military to extend the usable training airspace. ATCAAs typically have the same horizontal boundaries of the underlying MOA and an agreed upon ceiling.

Many of the Air Force managed MOAs available to aircrews in this region were first charted decades ago and have had minimal improvements over time to meet current and evolving training requirements. The DAF is proposing regional airspace modifications to address the training shortfalls caused by the insufficient existing special use airspace to include: changing the published times of use; adjusting the horizontal dimensions of one MOA; lowering the defined floor of some MOAs to allow for additional low-altitude training in the region; and adjusting the attributes of some airspace to allow for supersonic flight below 30,000 feet mean sea level and use of chaff and flares. The Proposed Action does not include any changes at the installations (personnel, infrastructure, aircraft inventory, or airfield operations), ground disturbance beneath the MOAs, or weapons deployment. The special use airspace being addressed in the EIS includes several Air Force managed MOAs and their associated ATCAAs (named Tombstone, Outlaw, Jackal, Morenci, Reserve, Bagdad, Gladden, Sells, Ruby, and Fuzzy) located throughout Arizona and a small area of western New Mexico (see Enclosure 1).

The DAF is soliciting comments on three preliminary alternatives that would optimize the existing MOAs. The EIS will also evaluate a No Action Alternative per 40 CFR 1502.14 (Alternative 1). Alternative 2 includes all proposed modifications to fully optimize the MOAs/ATCAAs. Alternatives 3 and 4 are variations of Alternative 2. A summary of each of these is provided below, please visit the project website (www.ArizonaRegionalAirspaceEIS.com) for detailed information on these alternatives.

Alternative 1 (No Action) – airspace optimization would not occur. None of the existing MOAs/ATCAAs would be modified.

Alternative 2 – optimize Air Force managed MOAs/ATCAAs to address insufficient airspace capability and capacity for training aircrews stationed at Davis-Monthan AFB, Luke AFB, and Morris ANGB. Major actions would include: changing the published times of use for the MOAs to align with current training hours; increasing the size of the Tombstone MOA/ATCAA by moving the northern boundary approximately 10 nautical miles to the north and lowering the subsonic floor to 100 feet above ground level (AGL); lowering the subsonic floor of four MOAs to 500 feet AGL (Outlaw, Jackal, Bagdad and Gladden MOAs); authorizing the use of chaff in Tombstone MOA and lowering the altitude for releasing flares in Tombstone, Outlaw, Jackal, Bagdad, and Gladden MOAs; and authorizing supersonic flight down to 5,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

Alternative 3 – optimize Air Force managed MOAs/ATCAAs to address insufficient airspace capability and capacity. Major actions would include all of those listed for Alternative 2 except for increasing the size of Tombstone MOA/ATCAA by expanding the northern boundary. The subsonic floor of the Tombstone MOA would still be lowered to 100 feet AGL. Additionally, to increase the low-altitude airspace available to support Davis-Monthan AFB, the subsonic floor of Jackal MOA would be lowered to 100 feet AGL.

Alternative 4 - optimize Air Force managed MOAs/ATCAAs to address insufficient airspace capability and capacity. Major actions would include all of those listed for Alternative 2 except that supersonic flight would be authorized down to 10,000 feet AGL in Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs.

The DAF is hosting open-house style public meetings at the locations, dates, and times listed in Enclosure 2. We would like to invite all members of your community to attend any of these meetings as part of the NEPA process. The project website (www.ArizonaRegionalAirspaceEIS.com) provides additional information on the proposal as well as a Virtual Meeting option for anyone that does not wish to attend a meeting in person.

We are requesting government-to government consultation with your community on preparation of this EIS, pursuant to Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, *Protection of Historic Properties*. The DAF is committed to sustained, meaningful and respectful consultation with federally recognized Indian Tribes. In accordance with the NEPA process, government-to-government consultation with federally recognized Tribal Nations is required per Executive Memorandum, April 29, 1994, *Government-to-Government Relations with Native American Tribal Governments*; Department of Defense (DoD) Instruction 4710.02: *DoD Interactions with Federally-Recognized Tribes*; and Department of Air Force Instruction (DAFI) 90-2002: *Interactions with Federally-Recognized Tribes.*

The DAF has determined that for the purposes of Section 106, the current project is an undertaking that should be subject to Section 106 analysis. Section 106 for the current project will be carried out in parallel to the NEPA process, and the results of Section 106 will inform the NEPA analysis. The DAF is soliciting any comments or concerns you may have at this time regarding the project, and is seeking any information you might be willing to share regarding properties of traditional or cultural significance that you feel should be considered in any analysis of the project. The DAF will continue Section 106 consultation with your tribe as more information becomes available regarding the finalized Area of Potential Effect (APE), DAF good faith efforts to identify historic properties within the APE, determinations of eligibility and effect, and any proposed mitigation for possible adverse effects.

The DAF Point of Contact for this project is Mr. Kevin Wakefield, EIAP Program Manager, at Davis-Monthan Air Force Base. Please send him your comments and concerns to 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035. Should your tribe have no further interest in this project, please let us know in writing, via email or letter. I look forward to receiving any input you may have regarding this endeavor. Thank you in advance for your assistance in this effort.

Sincerely,

JOSEPH C. TURNHAM, Colonel, USAF
Commander, 355th Wing

Enclosures: 1. Project Area Map
2. In-person Public Meeting Locations and Schedule

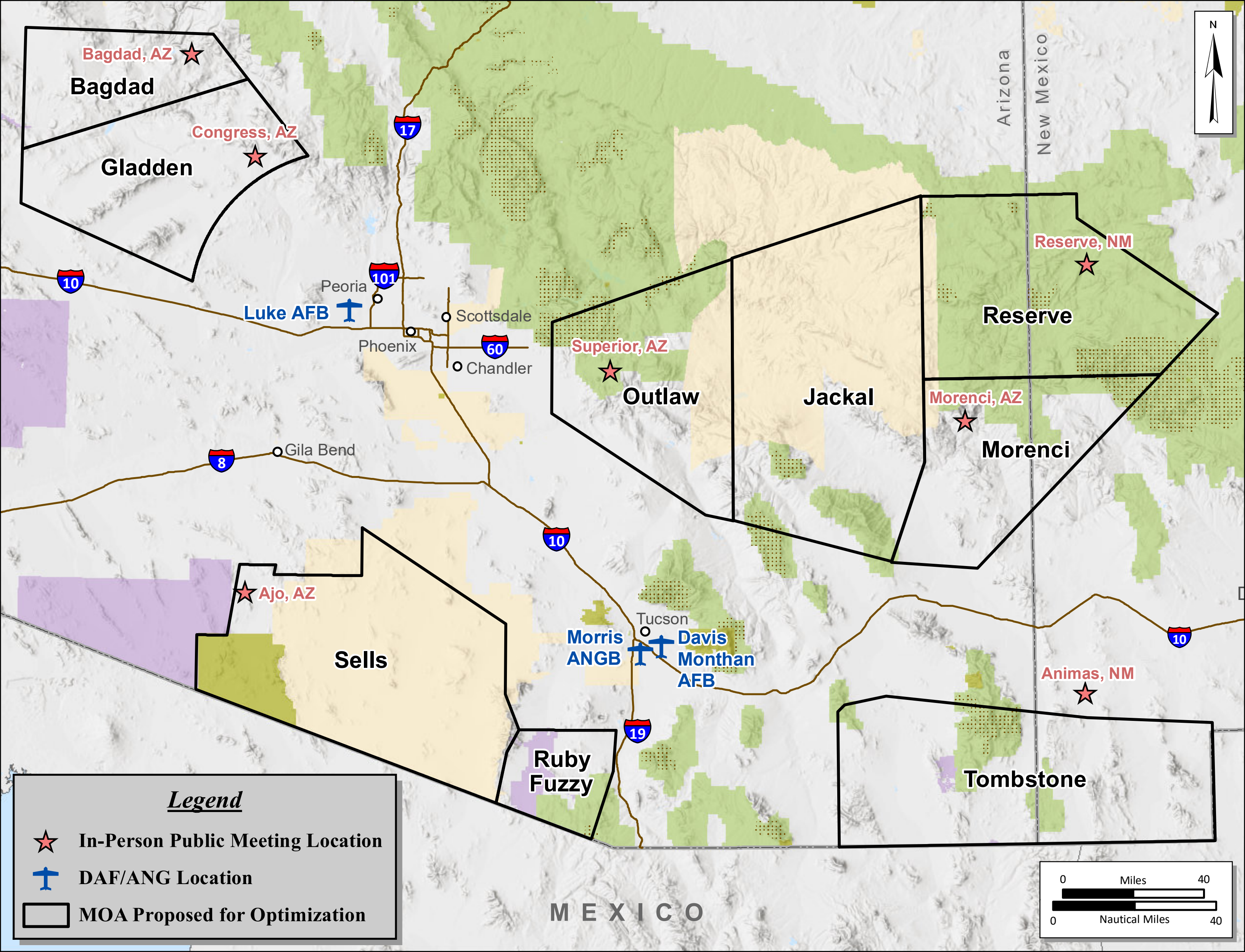
Sincerely,

GREGORY KREUDER
Brigadier General, USAF
Commander, 56th Fighter Wing

Sincerely,

BUTLER.JEFFREY.L.1154525617 Digitally signed by BUTLER.JEFFREY.L.1154525617 Date: 2021.12.11 07:08:27 -07'00'

JEFFREY L. BUTLER
Brigadier General, AZ ANG
Commander, 162d Wing



Bagdad, AZ
Bagdad
Congress, AZ
Gladden
17
101
10
Peoria
Luke AFB
Scottsdale
Phoenix
60
Chandler
Superior, AZ
Outlaw
Jackal
Reserve, NM
Reserve
Morenci, AZ
Morenci
Arizona
New Mexico
N
Gila Bend
8
10
Ajo, AZ
Sells
Tucson
Morris ANGB
Davis Monthan AFB
19
Ruby Fuzzy
Animas, NM
Tombstone
10
MEXICO
Legend
In-Person Public Meeting Location
DAF/ANG Location
MOA Proposed for Optimization
0
Miles
40
0
Nautical Miles
40

Enclosure 2

In-Person Public Meeting Locations		
Date	**Time (Local)**	**Location**
Monday, February 7, 2022	5:00 – 7:00 pm	Sonoran Desert Inn & Conference Center 55 South Orilla Avenue Ajo, AZ 85321
Tuesday, February 8, 2022	5:00 – 7:00 pm	Superior Town Hall 199 N Lobb Avenue Superior, AZ 85173
Wednesday, February 9, 2022	5:00 – 7:00 pm	Bagdad Event Center 121 Main Street Bagdad, AZ 86321
Thursday, February 10, 2022	5:00 – 7:00 pm	Congress Fire Department 26733 Santa Fe Road Congress, AZ 85332
Tuesday, February 22, 2022	5:00 – 7:00 pm	Village Hall 15 Jake Scott Street Reserve, NM 87830-0587
Wednesday, February 23, 2022	5:00 – 7:00 pm	Clifton Community Center 100 North Coronado Blvd Clifton, AZ 85533
Thursday, February 24, 2022	5:00 – 7:00 pm	Animas High School 1 Panther Blvd Animas, NM 88020

Dana Banwart

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Sent: Monday, February 14, 2022 3:16 PM
To: RMiguel@ak-chin.nsn.us; EPeters@ak-chin.nsn.us
Cc: BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; Dana Banwart; TREECE, ALICIA M CTR USAF ANGRC NGB/A4; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC
Subject: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement Follow-up
Attachments: Ak-Chin_10 Jan 2022.pdf

Categories: admin record

Greetings, I am writing to follow-up on our request for Government to Government Consultation for the Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement project.

Our original request was sent out via email on 20 January 2022 and we are hoping to conduct consultation with your tribe. Attached you will find a copy of the original request letter dated 20 January 2022.

If you have any additional questions, comments, or concerns please send those to Kevin Wakefield, 355 CES/CEIE, 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035.

Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

March 9, 2022

FROM: 355 CES/CEIE

SUBJECT: Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

Greetings, the Department of the Air Force (DAF) would like to invite your tribe into Section 106 consultations. The following installations are participants in this consultation, Davis-Monthan Air Force Base (DMAFB), Luke Air Force Base (LAFB), and Morris Air National Guard Base (MANGB).

The DAF has determined that for the purposes of Section 106, the current project is an undertaking that should be subject to Section 106 analysis. Section 106 for the current project will be carried out in parallel to the National Environmental Policy Act (NEPA) process, and the results of Section 106 will inform the NEPA analysis. The DAF is soliciting any comments or concerns you may have at this time regarding the project, and is seeking any information you might be willing to share regarding properties of traditional or cultural significance that you feel should be considered in any analysis of the project. The DAF will continue Section 106 consultation with your tribe as more information becomes available regarding the finalized Area of Potential Effect (APE), DAF good faith efforts to identify historic properties within the APE, determinations of eligibility and effect, and any proposed mitigation for possible adverse effects.

The enclosed letter was sent via email from the DAF Point of Contact, Kevin Wakefield, EIAP Program Manager at Davis-Monthan Air Force Base, Kevin.Wakefield.1@us.af.mil, to your Tribe on January 20, 2022 and February 14, 2022. The enclosed hard copy is being provided as an additional contact since we haven't received a response from you. Please send the DAF Point of Contact your comments and concerns to 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035. Thank you and we look forward to hearing from you.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Dana Banwart

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Sent: Tuesday, April 12, 2022 12:24 PM
To: EPeters@ak-chin.nsn.us; RMiguel@ak-chin.nsn.us
Cc: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; Dana Banwart; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN
Subject: Government to Government Consultation Request Arizona Airspace EIS

Categories: admin record

Greetings, the United States Air Force is following up on our request for Government to Government Consultation with your tribe. We originally send out our first request by email on 20 Jan 2022, followed up with an email on 14 Feb 2022. We then discovered that many of the emails sent did not reach the recipients.

On 11 March 2022, we send hard copy letter requesting Government to Government Consultation to the tribes we have not heard from. We would like to hear from you and your tribe regarding our request for consultation and any concerns you may have.

Please email me at kevin.wakefield.1@us.af.mil with any comments.

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
DSN: 228-4035
Comm: (520) 228-4035

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

2 May 2022

MEMORANDUM FOR ENVIRONMENTAL IMPACT STATEMENT FOR REGIONAL SPECIAL USE AIRSPACE OPTIMIZATION TO SUPPORT AIR FORCE MISSIONS IN ARIZONA

FROM: 355 CES/CEI

SUBJECT: Amended Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona

1. On January 18, 2022, the Department of the Air Force (DAF) issued a Notice of Intent to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available to support Air Force missions in Arizona (Vol. 87, No. 11 Federal Register, 2597, January 18, 2022). The Notice of Intent announced a 45-day formal scoping period through March 4, 2022, included the dates and locations of in-person scoping meetings, and solicited public comments on the DAF's proposed action. In response to public and stakeholder input received during the initial scoping period, the DAF has decided to extend the formal scoping comment period for this EIS.

2. The Amended Notice of Intent extends the formal scoping comment period through June 3, 2022 to allow additional time for the interested public to review the proposed action and submit scoping comments. No changes have been made to the proposed action. All handouts and displays are available on the project website (www.ArizonaRegionalAirspaceEIS.com). Comments submitted during the initial public scoping period from January 18 – March 4, 2022 are currently being reviewed and do not need to be resubmitted. Further comments can be provided through the project website and via mail to the address listed below:

Arizona Regional Airspace EIS
c/o Cardno
501 Butler Farm Rd., Suite H
Hampton, VA 23666

3. Further scoping comments are requested by June 3, 2022 to ensure full consideration in the Draft EIS.

Sincerely,

CHRISTOPHER L. BREWSTER, PE
Chief, Environmental

Dana Banwart

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Sent: Monday, May 9, 2022 11:16 AM
To: RMiguel@ak-chin.nsn.us; EPeters@ak-chin.nsn.us
Cc: KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; Dana Banwart; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE
Subject: Section 106 Consultation – Ak-Chin Indian Community - EIS for Regional Special Use Airspace Optimization
Attachments: AZ Airspace EIS-ANOI Stakeholder Memo_1.pdf; Published ANOI 4 May 2022.pdf
Signed By: kevin.wakefield.1@us.af.mil

Categories: admin record

Greetings, the Air Force has Amended the Notice of Intent to extend the formal scoping comment period through June 3, 2022 to allow additional time for the interested public to review the proposed action and submit scoping comments. No changes have been made to the proposed action. The Amended Notice of Intent is attached for your review. We have also included a copy of the Published ANOI that appeared in the National Register on 4 May 2022.

The Amended Notice of Intent has no effect on the ongoing Government to Government Consultation with your tribe. We look forwarded to continuing consultation on this project as it moves forward.

Sincerely,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mil
DSN: 228-4035
Comm: (520) 228-4035

Leadership with Loyalty, Integrity & Wisdom

Tohono O'odham Nation
Office of the
Chairman and Vice Chairwoman

Ned Norris Jr. Wavalene M. Saunders
Chairman Vice Chairwoman

March 4, 2022

Arizona Regional Airspace EIS
c/o Cardno
501 Butler Farm Rd., Suite H
Hampton, VA 23666

Re: Written Comments in Response to January 18, 2022 Notice of Intent to Prepare an Environmental Impact Statement for Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear Arizona Regional Airspace,

I am submitting these written comments on behalf of the Tohono O'odham Nation, a federally recognized Indian tribe with more than 34,000 members. The Tohono O'odham Nation ("Nation") consists of more than 2.8 million acres in southern Arizona. Although the Nation has supported the United States Air Force's training operations based at the Luke Air Force Base, 56th Fighter Wing, the Nation is opposed to Alternatives 2, 3, and 4 for the Sells Military Operations Area and adjacent MOAs, Ruby and Fuzzy.

No Tribal Consultation. The Tohono O'odham Nation is not aware of the Air Force, Federal Aviation Administration, and Department of Defense conducting any tribal consultations prior to the January 18, 2022 Notice of Intent. Instead, the Tohono O'odham Nation became aware of the Proposed Action to change published times of use; adjust the horizontal dimensions of some airspace; lower the floor of some airspace to allow for low-altitude training; and adjust airspace attributes to allow for supersonic speed at lower altitude through a local news report. Pursuant to the Department of Defense Tribal Consultation Policy, the Tohono O'odham Nation welcomes an opportunity for communication on a government-to-government basis, in recognition of the Nation's sovereignty, on this matter and an assessment, through consultation, of the effect of the proposed Department of Defense action that may have the potential to significantly affect the Nation and its members.

Opposition to Extended Times of Use. The Tohono O'odham Nation opposes Alternatives 2, 3, and 4, which would expand the times of use at the Sells MOA from 0600-1900 to 0600-2400. Currently, Luke Air Force Base, 56th Fighter Wing has the option to train in the Sells MOA until 1900. Alternatives 2, 3, and 4 would extend the times of use to an unacceptable 2400. Tohono O'odham Nation's members value the quiet enjoyment of their homes and residences within the Sells MOA without disruptions, noise, or possible sonic booms. For these reasons, the Tohono O'odham Nation opposes Alternatives 2, 3, and 4.

Support for Alternative 1. The Tohono O'odham Nation is collaborating with Luke Air Force Base, 56th Fighter Wing to address some of current concerns with existing operations. As such, the Tohono O'odham Nation strongly supports Alternative 1, no action, for the Sells MOA and adjacent MOAs, Ruby and Fuzzy. Nation's members deserve the opportunity to enjoy the relative peace and quiet of their homes in the evening without fear of disruptive operations or training exercises until 12:00 a.m.

Future Communications. For the remainder of the Environmental Impact Statement process, please contact Christine VanDyk at Christine.VanDyk@tonation-nsn.gov from my office to keep the Tohono O'odham Nation informed as the Air Force, Federal Aviation Authority, and Department of Defense concludes the scoping process and provides the draft EIS.

Sincerely,

Ned Norris, Jr., Chairman
Tohono O'odham Nation

cc: Tohono O'odham Legislative Council

GWENDENA LEE-GATEWOOD
EXECUTIVE OFFICE OF THE CHAIRWOMAN
WHITE MOUNTAIN APACHE TRIBE

March 4, 2022

Grace Keesling
Arizona Regional Airspace EIS
C/O Cardno
501 Butler Farm Road, Suite H
Hampton, Virginia 23666

Submitted electronically at: www.ArizonaRegionalAirspaceEIS.com

Re: White Mountain Apache Tribe Scoping Comments for the Proposed Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona

Dear M. Keesling:

The White Mountain Apache Tribe ("Tribe") submits this comment as a supplement to the comment submitted on March 3rd by the Tribe's Historic Preservation Officer, Mark Altaha.

The Proposed Action concerns the Tribe because of the impacts of past similar activities on endangered, sensitive, and culturally significant species.

In the past, when the Air Force conducted similar low altitude training activities over Salt River Canyon it disturbed seasonal nesting production of both Bald eagles (*Haliaeetus leucocephalus*), Golden eagles (*Aquila chrysaetos*) and Peregrine falcon (*Falco peregrinus*). The Tribe would prefer that this vicinity be completely avoided by low altitude flights because of the populations of year-long resident raptors, all of which are culturally significant to the Tribe. It is especially imperative that Salt River Canyon be excluded from training activities immediately before, during and after nesting seasons of these species.

The Tribe is also concerned with flights over and near the Black and White Rivers, and its mountain lakes, particularly Sunrise and Hawley Lake, which provide year-round habitat for raptors and water fowl, and tourism and recreation income. These areas should be avoided, especially for low altitude flights and sonic boom noise impacts.

The Reservation's populated areas of Hon-Dah/McNary, Whiteriver, Cedar Creek, and Cibecue are home to many Tribal elders for whom sonic boom and enginenoises caused by low altitude flights may provoke anxiety and other adverse health impacts. The Tribe, accordingly requests that the current 30,000 foot floor for supersonic flights remain in place over these regions of the Fort Apache Indian Reservation.

The Tribe reiterates THPO Mark Altaha's request for further consultation, including a face-to-face meeting with the Department of Defense to discuss uses of airspace over the Reservation and impacts to wildlife and people. Please contact the Tribe's Office of the Attorney General at (928) 338-2537 or MichelleStanding@wmat.us to set up a consultation meeting.

The Tribe looks forward to working with you to ensure that the vital training needs of the Air Force are met in a manner that compliments and reinforces our sovereign nation's priorities and needs.

Sincerely,

Gwendena Lee-Gatewood
Chairwoman

Cc. Jerome Kasey III, Vice-Chairman
Tribal Councilmembers
Office of the Attorney General
Mark Altaha, THPO
Stuart Leon, Director, Game and Fish
File

Terry Rambler
Chairman

SAN CARLOS APACHE TRIBE

P.O. Box 0, San Carlos, Arizona 85550
Phone (928) 475-1600 ❖ Fax (928) 475-2567

Tao Etpison
Vice-Chairman

March 4, 2022

<u>Via E-Mail and U.S. Postal Service</u>

Colonel Joseph C. Turnham
Wing Commander
355th Wing – Davis-Monthan

Christopher L. Brewster, PE
Chief, Environmental
Cardno
501 Butler Farm Road – Suite H
Hampton, Virginia
www.ArizonaRegionalAirspaceEIS.com

Jesse Durham
Acting Regional Director
Western Region
Bureau of Indian Affairs
U.S. Department of Interior
2600 N. Central Avenue
Phoenix, Arizona 85004
E-M: jesse.durham@bia.gov

Dear Col. Turnham, Mr. Brewster and Acting BIA Western Regional Director Durham:

On behalf of the nearly 17,000 members of the San Carlos Apache Tribe ("Tribe"), the Anchor 7, Tonto, Ash Creek, Slaughter and Point of Pine Cattle Associations, and the Tribe's R-100 Herd Program, I provide comments regarding the Notice of Intent to prepare an Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona ("EIS"). The date of this submission is March 4, 2022, and it is thus timely.

The Tribe appreciates the opportunity to comment on the EIS. However, the Tribe requests government-to-government consultation on the EIS before making a decision as to whether to support or object.

As a preliminary matter, many members of the Tribe have and currently serve throughout each of the branches of the U.S. Military. We are proud of our record of service, and we thoroughly support the U.S. Military in its mission to keep America safe. We also understand the importance of the Air Force's needs and requirements to be fully combat ready.

Background

Our Reservation covers some 1.8 million acres of land in southeastern Arizona, located between the Towns of Dudleyville, Thatcher and Globe. Our Reservation is home to some 8,000 head of cattle and horses, and herds of deer (Coues and Mule), elk, big horn sheep, turkey, and other game, whose rangeland covers some 1 million acres. Game and fish represent an essential element of our Tribe's culture and economy – earning more than $2 million annually. Similarly, the Tribe's Forest consists of 55,000 acres of timber, some of which is currently valued at least a billion dollars; however, it is a working forest, meaning that any fire adversely affects not just revenue, but all wildlife and water, as well as foodstuffs and medicine important to our Tribe's members' diet and traditional religion, for which any damage is nearly incalculable.

Notice of Intent

As to this EIS, unfortunately, the Tribe was not provided the Notice of Intent. Nor was there any considered effort to achieve the government-to-government consultation contemplated under Executive Order No. 13175 (65 Fed.Reg. 67249, Nov. 6, 2000), or the terms of President Biden's Memorandum of January 26, 2021, on Tribal Consultation and Strengthening Nation-to-Nation Relationships, which the U.S. Department of Defense is currently seeking comments on.

Previously, the Air Force has met with the San Carlos Council on other projects, such as Luke Air Force Base on the F-35A; however, consultation has not happened on this EIS. Nor does the listing on the project's website www.ArizonaRegionalAirspaceEIS.com amount to consultation. Instead, it appears that only the Bureau of Land Management ("BLM") was contacted.

Unfortunately, the Tribe found about the EIS third hand from the Acting San Carlos Agency Superintendent, Leon Ben, in an e-mail dated February 2, 2022. It is my further understanding that Tonto National Forest was also unaware of the EIS until contacted by the Bureau of Land Management. TNF, in turn, then contacted Apache-Sitgreaves and Coronado National Forest.

Government-to-Government Consultation

As expressed under the President Biden's Memorandum, among other things, there ought to be procedures to ensure that consultation be regular, meaningful, and robust; that the capacity of military installations leaders and staff be enhanced to engage effectively with tribes and foster stronger relationships; and that any federal action impacting tribes protect tribal lands, rights and resources from the impacts related to the ongoing operations of military installations and training activities.

It is my request that you suspend the EIS until face-to-face, government-to-government consultation may occur between the Air Force and the San Carlos Council here on our Reservation. This request is not made in effort to delay the EIS, or any necessary combat training, especially in these times of global conflict. However, consultation is necessary for our Council to fully understand and comment on the proposed EIS.

Comments

The comments expressed herein are preliminary in nature, and are not to be considered final, as the Tribe does not have the expertise to review the EIS. To this end, the Tribe requests that the U.S. Department of Interior, by and through the Bureau of Indian Affairs Western Region and any other applicable agencies, provide technical assistance and experts to evaluate any potential adverse impacts to the Tribe, its members, its lands, its environs, and any wildlife.

Preliminarily, from the EIS, it appears that the Air Force seeks to widen its existing Military Operations Areas ("MOA") boundaries. In addition, it appears that the Air Force seeks to lower the floor on some MOA airspace, some down to 500 feet above ground level ("AGL"); lower the subsonic floor of some MOAs to as low as 100 AGL; and, to authorize the use of flares and chaff.

Many cattlemen have noted numerous instances of Air Force equipment flying below 500 feet AGL, and multiple incidents of sonic booms that frighten livestock. The Tribe does not have the resources to log and report these events. Nor does the Tribe know or fully understand any potential impacts of sonic booms or low-level aircraft on animals or wildlife on our Reservation.

There are numerous studies that show the effects of sonic booms and low-flying aircraft on domestic animals and wildlife, but these appear to have contradictory results. Some studies indicate that the noise can influence the behavior of animals, while the variation of pressure itself could eventually cause physiopathological disorders. *See* Ph. Cottereau, Sonic Boom Exposure Effects II.5: Effects on Animals, Ecole Nationale Veterinaire de Lyon, Science Direct, https://www.sciencedirect.com/sdfe/pdf/download/eid/1-s2.0-0022460X72906773/first-page-pdf. Other studies indicate the opposite. *See* Bunch, Thomas D., and Gar W. Workman, Sonic Boom/Animal Stress Project Report on Elk, Antelope and Rocky Mountain Bighorn Sheep, Journal of the Acoustical Society of America, 1993, https://digitalcommons.usu.edu/grcanyon/216/. No such study of the impact of sonic booms or low-level flying aircraft has been undertaken on our Reservation.

As to the dropping of flares and chaff by Air Force equipment, the Tribe has documented at least 10 events over the period of 2004 through 2021. *See* Figure 1, at page 5 below, Map of Flare Caused Fires. These flares-caused fires were responsible for damaging 21,163.7 acres. A photograph of flare casing found on the Reservation, which the Tribe has circulated to warn members if anyone happens to come across such an object. *See* page 6, below. Also attached, on page 7, are photographs of two recent fires. The Air Force has yet to compensate the Tribe for these fires. And, in this era of increased forest fires due to the megadrought affecting Arizona, any flare-caused fire has the potential to be far more devastating than the last.

Lastly, high-speed jets flying at 500 AGL, may pose a substantial risk for Air Tankers, which regularly fly over our Reservation while fighting wildland fires. Currently, Fort Apache Helitack, Springerville Helitack, Air Attack and Single Engine Air Tanker fly in the MOAs and Fly Routes listed in the EIS. Fort Apache Helitack flies primarily in the Jackal Reserve, Outlaw and sometimes in the Morenci MOAs, which include our Reservation and the Fort Apache Indian Reservation of our sister tribe.

Typically, Fire Dispatch offices know when the MOA and Fly Routes are active, or HOT, but this is not always the case. Dispatch and Incident Management Teams may have to be quick on establishing Temporary Flight Restriction, especially during an Initial Attack emergency to avoid deconfliction – the EIS makes no mention of this potential issue.

Conclusion

At this time, the Tribe's comments expressed herein can only be considered as preliminary, but, as such, they do express our concerns. To make a fully informed decision as to whether to support or object to the EIS, the Tribe requests a suspension of the EIS until such time as the U.S. Department of Interior may provide the technical assistance and expertise within which to evaluate the EIS. Only then, after the Tribe may receive a report on the potential impacts to the Tribe's members, its lands, its environs, and any wildlife may the Tribe provide complete comments.

As we say in our Apache language, Ahi'yi'é (thank you) for accepting these preliminary comments and for your consideration of the Tribe's request to suspend the EIS until the Tribe receives technical assistance to review the EIS, and upon such time that the Tribe and the Air Force have had the opportunity to engage in government-to-government consultation. Please do not hesitate to let me know if there are any questions. I look forward to hearing back from you.

Sincerely,

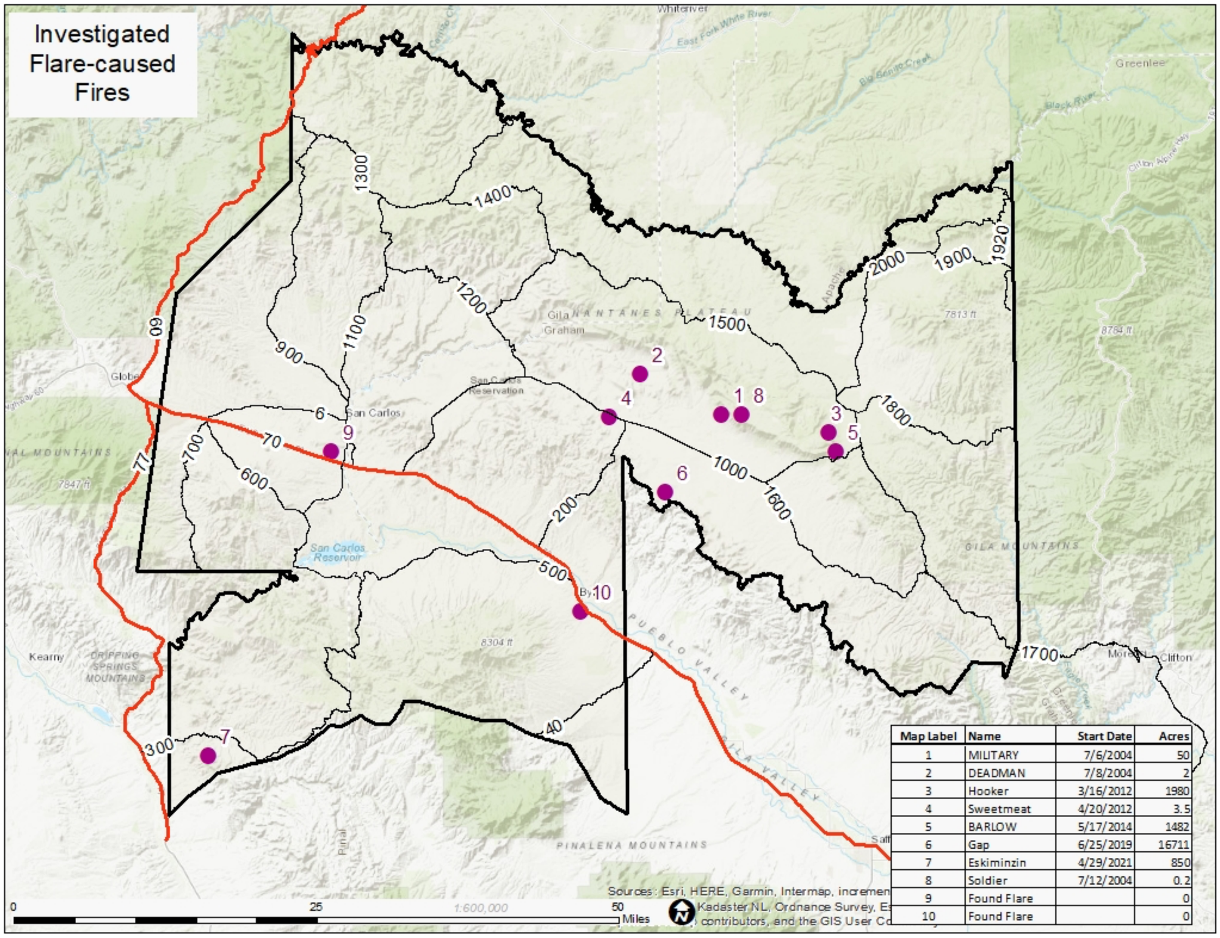
SAN CARLOS APACHE TRIBE

Terry Rambler
Chairman

Cc: Arizona Tribal Leaders
c/o Maria Dadgar, Exec. Dir., ITAA, maria.dadgar@itcaonline.com
Captain Elias Small, Chief, Public Affairs, D-MAFB, elias.small@us.af.mil
Michael Toriello, Tribal & Community Liaison, D-MAFB, Michael.toriello@us.af.mil
Lt. Lillia Calvillo, Public Affairs Officer, D-MAFB, lillia.calvillo.1@us.af.mil
Jessie Durham, Acting Regional Director, Western Region, BIA, jessie.durham@bia.gov
Leon Ben, Acting Superintendent, San Carlos Agency, BIA, leon.ben@bia.gov
Joel Kerley, National Aviation Manager, Wildland Fire Mgt., BIA, joel.kerley@bia.gov
Kurt Davis, Supervisor, Coronado National Forest
Judy Palmer, Supervisor, Apache-Sitgreaves National Forest
Neil Bosworth, Supervisor, Tonto National Forest
Taiga Rohrer, Forest Fire Staff, TNF, taiga.rohrer@usda.gov

<u>San Carlos Apache Tribe</u>
Tao Etpison, Vice Chairman
San Carlos Council Members
Victoria Wesley, Manager, Forest Resources
Tim Stevens, Exec. Dir., RWD
Vernelda Grant, THPO

Figure 1 – Map of Flare Caused Fires



Map Label	Name	Start Date	Acres
1	MILITARY	7/6/2004	50
2	DEADMAN	7/8/2004	2
3	Hooker	3/16/2012	1980
4	Sweetmeat	4/20/2012	3.5
5	BARLOW	5/17/2014	1482
6	Gap	6/25/2019	16711
7	Eskiminzin	4/29/2021	850
8	Soldier	7/12/2004	0.2
9	Found Flare		0
10	Found Flare		0


WARNING!
If you see this item, DO NOT touch. Immediately call San Carlos Police Dept at (928-475-2311). This is a military explosive device and you can be seriously injured if handled.
Aprrox 7.5in long x 2in wide

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	MichelleStanding@wmat.us
Cc:	OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; WALZ, ANGELA M Maj USAF ANG 162 WG/PA; Dana Banwart; HARTY, JENNIFER L GS-13 USAF ANG NGB/A4VN; KUCHAREK, KRISTI L GS-13 USAF ANGRC NGB/A4; TREECE, ALICIA M CTR USAF ANGRC NGB/A4; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; BREWSTER, CHRISTOPHER L GS-13 USAF ACC 355 CES/CEIE; TORIELLO, MICHAEL R GS-14 USAF ACC 355 WG/CPD
Subject:	Consultation Meeting - White Mountain Apache Tribe
Date:	Monday, July 11, 2022 3:12:11 PM
Attachments:	~~White Mtn Apach[redacted]Section[redacted]Response[redacted]4March2022.pdf~~

Greetings, I am writing regarding a face-to-face meeting requested by Chairwoman Gwendena Lee-Gatewood. The purpose of the meeting will be to discuss the Proposed Regional Special Use Airspace Optimization Environmental Impact Statement being prepared by the US Air Force to support missions in Arizona and the concerns identified in her letter.

As stated in her letter dated 4 March 2022 a face-to-face meeting was request, would it be possible to have a meeting using Zoom because of the recent increase of COVID-19 cases.

My email is kevin.wakefield.1@us.af.mil and my phone number is 520-228-4035. My personal cell phone number is 520-289-4603.

Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mil
DSN: 228-4035
Comm: (520) 228-4035

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Rudolph R. Shebala
Cc:	Jonathan Nez; Myron Lizer; Paulson Chaco; Richard M. Begay; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; Dana Banwart; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN
Subject:	RE: Response
Date:	Tuesday, April 12, 2022 2:52:52 PM

Thank you Dr. Shebala, we look forward to establishing a relationship with the Navajo Nation as we move forward with this action.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Rudolph R. Shebala <rudyshebala@navajo-nsn.gov>
Sent: Tuesday, April 12, 2022 11:38 AM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Cc: Jonathan Nez <jonathannez@navajo-nsn.gov>; Myron Lizer <myronlizer@navajo-nsn.gov>; Paulson Chaco <paulsonchaco@navajo-nsn.gov>; Richard M. Begay <r.begay@navajo-nsn.gov>
Subject: [URL Verdict: Unknown][Non-DoD Source] Response

Dear Kevin,
I found your email in my firewall in box. I am writing you to establish contact.
Sincerely,

Rudolph R. Shebala Ph.D.
Executive Director
DIVISION OF NATURAL RESOURCES
THE NAVAJO NATION

Phone 928-871-6952/6953 **Mobile** 928-259-9892
Web www.dnr.navajo-nsn.gov **Email** rudyshebala@navajo-nsn.gov
P.O. Box 9000 Window Rock, AZ 86515

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Peter Steere
Cc:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; Dana Banwart; TREECE, ALICIA M CTR USAF ANGRC NGB/A4; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE
Subject:	RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement Follow-up
Date:	Tuesday, February 15, 2022 3:21:30 PM

Yes sir, will work on getting it together.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Peter Steere <Peter.Steere@tonation-nsn.gov>
Sent: Tuesday, February 15, 2022 12:57 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: [Non-DoD Source] RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement Follow-up

Kevin

Please send me maps showing routes over the Tohono O'odham Nation and any changes in flighjt elevations and speed

peter

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE [mailto:kevin.wakefield.1@us.af.mil]
Sent: Monday, February 14, 2022 2:16 PM
To: Peter Steere <Peter.Steere@tonation-nsn.gov>; Jefford Francisco <Jefford.Francisco@tonation-nsn.gov>
Cc: KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN <grace.keesling.1@us.af.mil>; Dana Banwart

(Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; TREECE, ALICIA M CTR USAF ANGRC NGB/A4 <alicia.treece.2.ctr@us.af.mil>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC <kevin.oberry@us.af.mil>; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE <christopher.brewster@us.af.mil>
Subject: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement Follow-up

Greetings, I am writing to follow-up on our request for Government to Government Consultation for the Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement project.

Our original request was sent out via email on 20 January 2022 and we are hoping to conduct consultation with your tribe. Attached you will find a copy of the original request letter dated 20 January 2022.

If you have any additional questions, comments, or concerns please send those to Kevin Wakefield, 355 CES/CEIE, 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035.

Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Peter Steere
Cc:	Dana Banwart; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; TREECE, ALICIA M CTR USAF ANGRC NGB/A4; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE
Subject:	RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement Follow-up
Date:	Tuesday, February 15, 2022 4:21:20 PM
Attachments:	~~Sells, Ruby[redacted]uzzy 2.pdf~~ ~~Poster 3 MOAs Proposed for Op[redacted]ation - Sells, Ruby, and Fuzzy.pdf~~

Dear Mr. Steere, I have attached the poster for the Sells, Ruby, and Fuzzy MOAs, on page two of the document it lists the changes that will be made. The only change being made is to the "Times of Use". The proposed change would be "0600-2400 M-F, other times by NOTAM". The second document attached "Poster 3" shows the locations of the MOAs and describes the alternatives we are reviewing in the EIS, again the only change is to the time of use. Proposed changes to these MOAs would be limited to adjusting the published times of use to align with how they are currently used. There are no other changes to the dimensions, supersonic authorization, or chaff and flare usage. The area of the reservation currently overflown by the MOAs would remain unchanged with this action.

There is also an interactive map on the website that is very useful. You can enter your address (or zip code or city name or whatever) in the search box and the map will zoom to that location. From there, the user can zoom out as much as they want to see where they are within the footprint of the airspace in question. This feature is on the Proposed Action Overview page. The only limitation is that it does not show the boundary of the reservation.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Peter Steere <Peter.Steere@tonation-nsn.gov>
Sent: Tuesday, February 15, 2022 12:57 PM

To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: [Non-DoD Source] RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement Follow-up

Kevin

Please send me maps showing routes over the Tohono O'odham Nation and any changes in flighjt elevations and speed

peter

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE [mailto:kevin.wakefield.1@us.af.mil]
Sent: Monday, February 14, 2022 2:16 PM
To: Peter Steere <Peter.Steere@tonation-nsn.gov>; Jefford Francisco <Jefford.Francisco@tonation-nsn.gov>
Cc: KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN <grace.keesling.1@us.af.mil>; Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; TREECE, ALICIA M CTR USAF ANGRC NGB/A4 <alicia.treece.2.ctr@us.af.mil>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC <kevin.oberry@us.af.mil>; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE <christopher.brewster@us.af.mil>
Subject: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement Follow-up

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If you have any additional questions, comments, or concerns please send those to Kevin Wakefield, 355 CES/CEIE, 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035.

Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi

DSN: 228-4035
Comm: (520) 228-4035

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Dana Banwart
Cc:	KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject:	FW: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement
Date:	Thursday, January 20, 2022 4:28:29 PM

FYI,

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Chris Coder <ccoder@yan-tribe.org>
Sent: Thursday, January 20, 2022 2:21 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: [Non-DoD Source] RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Check!

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE [mailto:kevin.wakefield.1@us.af.mil]
Sent: Thursday, January 20, 2022 2:17 PM
To: Chris Coder <ccoder@yan-tribe.org>
Cc: Vincent Randall <vrandall@yan-tribe.org>; 'Seth Pilsk' <sethpilsk@gmail.com>; markaltaha@wmat.us; Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN <grace.keesling.1@us.af.mil>
Subject: RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Thanks Mr. Coder, we will annotate your comments and deferral to the White Mountain and San Carlos Apache Tribes.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Chris Coder <ccoder@yan-tribe.org>
Sent: Thursday, January 20, 2022 2:02 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Cc: Vincent Randall <vrandall@yan-tribe.org>; 'Seth Pilsk' <sethpilsk@gmail.com>; markaltaha@wmat.us
Subject: [Non-DoD Source] RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Hello Kevin,
Thank-you for the information regarding the project and the MOA. As a matter of geography the Yavapai-Apache Nation (YAN) of Camp Verde has NO concerns regarding this project. Our only comment is that we defer to the White Mountain Apache Tribe and the San Carlos Apache Tribes concerns. Judging by the project map their airspace will be affected more directly than our part of the state. If you require any further clarification do not hesitate to contact me.

Culturally yours,
Chris Coder/Archaeologist/YAN

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE [mailto:kevin.wakefield.1@us.af.mil]
Sent: Thursday, January 20, 2022 8:08 AM
To: Chris Coder <ccoder@yan-tribe.org>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Greeting, the Department of the Air Force (DAF) would like to invite your tribe into Section 106 consultations. The following installations are participants in this consultation, Davis-Monthan Air Force Base (DMAFB), Luke Air Force Base (LAFB), and Morris Air National Guard Base (MANGB).

The DAF has determined that for the purposes of Section 106, the current project is an undertaking that should be subject to Section 106 analysis. Section 106 for the current project will be carried out in parallel to the NEPA process, and the results of Section 106 will inform the NEPA analysis. The DAF is soliciting any comments or concerns you may have at this time regarding the project, and is seeking any information you might be willing to share regarding properties of traditional or cultural significance that you feel should be considered in any analysis of the project. The DAF will continue Section 106 consultation with your tribe as more information becomes available regarding the finalized Area of Potential Effect (APE), DAF good faith efforts to identify historic properties within the APE, determinations of eligibility and effect, and any proposed mitigation for possible adverse effects.

The DAF Point of Contact for this project is Mr. Kevin Wakefield, EIAP Program Manager, at Davis-Monthan Air Force Base. Please send him your comments and concerns to 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035.
Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; Grace Manuel; Dana Banwart
Cc: BUCHANAN, CHARLES E CIV USAF AETC 56 RMO/CC; SHUMAKER, JON M GS-11 USAF AETC 56 RMO/ESMC
Subject: Consultation Meeting with Tohono O"odham Nation
Date: Monday, June 27, 2022 5:41:34 PM
Attachments: ~~RSOP Section 106 Consultation Prep Folder for 56 FW_CC.docx~~
~~RSOP Section 106 Consultation with TO Nation.docx~~

All-

For the log and the record: 56 FW/CC, Brig Gen Kreuder, met via ZoomGov.com with T.O. Nation Chairman Norris on Thursday, 23 Jun from 11:00a - 12:20p. A lot of information was exchanged and the Nation asked to meet again in July. Brig Gen Kreuder plans to host Chairman Norris and other leaders of the Nation at Luke AFB to provide a mission orientation and continue the consultation process for the RSOP EIS.

That attached documents indicate the agenda and consultation goals of the meeting. There were no decisions made re the EIS alternatives or potential impacts to historic properties. The Nation supports EIS Alternative 1: No Action. The 56 FW believes none of the proposed Alternatives would impact the Nation's interests or historic properties.

R/

Kevin O'Berry
Intergovernmental Liaison
56th Range Management Office
Luke AFB, AZ
O-623-856-5857
M-602-663-1395

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Michael Darrow; shinii@aol.com; Jeff Haozous
Cc:	Dana Banwart; Lori Ware; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN
Subject:	RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement
Date:	Monday, January 24, 2022 4:02:24 PM
Attachments:	Jackal-Outlaw-Morenci-[redacted]FactSheet.pdf Tombsto[redacted]heet.pdf

Dear Mr. Darrow, attached I have provided the fact sheets that show the locations of the Jackal-Outlaw-Morenci-Reserve MOA and Tombstone MOAs. Page one of the fact sheet it shows the location of the MOAs and a 3-DE view of the airspace, on page 2 we lists the proposed changes if any for the areas listed by alternative.

Hope this information helps you understand the propose action of the project.

Can you provide emails for Mr. Harry W. Basehart, and Mr. Morris E Opler, you referenced them in your email.

Thank you,

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Michael Darrow <michael.darrow@fortsillapache-nsn.gov>
Sent: Thursday, January 20, 2022 3:08 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; shinii@aol.com; Jeff Haozous <jeff@fortsillapache.com>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; Lori Ware <lori.g.ware@fortsillapache-nsn.gov>
Subject: [Non-DoD Source] RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Dear Kevin Wakefield;

Thank you for the email regarding the Section 106 Consultation Request Arizona Special Use Airspace (SUA) optimization Environmental Impact Statement. The current Chair of the Fort Sill Apache Tribe is Lori Gooday Ware (lori.g.ware@fortsillapache-nsn.gov). The previous chairman, Jeff Haozous, is no longer in place. The Reserve, Morenci, and Tombstone MOAs and ATCAAs appear to be located on areas that were Fort Sill (Chiricahua/Warm Springs) Apache territory. I am currently unfamiliar with the potential effects of changes to the Special Use Air Force Optimization and will need to investigate a bit further. The request is for information on properties of religious and cultural significance to the Tribe. Initially for that reference one should check with Harry W. Basehart, and Morris E Opler who each worked on the land claims for the Chiricahua and Warm Springs Apache Tribe. I may be able to help with some extra information that may be of use for an EIS or to review suggestions. Please keep us informed as the project progresses.

Michael Darrow
Section 106 Contact
Fort Sill Apache Tribe
43187 US Highway 281
Apache, Oklahoma 73006
580 588-2298

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Sent: Thursday, January 20, 2022 8:21 AM
To: shinii@aol.com; Jeff Haozous <jeff@fortsillapache.com>; Michael Darrow <michael.darrow@fortsillapache-nsn.gov>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Greeting, the Department of the Air Force (DAF) would like to invite your tribe into Section 106 consultations. The following installations are participants in this consultation, Davis-Monthan Air Force Base (DMAFB), Luke Air Force Base (LAFB), and Morris Air National Guard Base (MANGB).

The DAF has determined that for the purposes of Section 106, the current project is an undertaking that should be subject to Section 106 analysis. Section 106 for the current project will be carried out in parallel to the NEPA process, and the results of Section 106 will inform the NEPA analysis. The DAF is soliciting any comments or concerns you may have at this time regarding the project, and is seeking any information you might be willing to share regarding properties of traditional or cultural significance that you feel should be considered in any analysis of the project. The DAF will continue Section 106 consultation with your tribe as more information becomes available regarding the finalized Area of Potential Effect (APE), DAF good faith efforts to identify historic properties within the APE, determinations of eligibility and effect, and any proposed mitigation for possible adverse effects.

The DAF Point of Contact for this project is Mr. Kevin Wakefield, EIAP Program Manager, at Davis-Monthan Air Force Base. Please send him your comments and concerns to 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035.
Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Karl Hoerig; Peter Yucupicio
Cc:	Dana Banwart; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN
Subject:	RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement
Date:	Monday, January 24, 2022 3:51:46 PM
Attachments:	~~Sells-Ruby-Fuzzy[redacted]Factsheet_1.pdf~~ ~~Tombstone[redacted]Factsheet.pdf~~

Dr. Hoerig, attached I have provided the fact sheets that show the locations of the Ruby Fuzzy and Tombstone MOAs. Page one of the fact sheet it shows the location of the MOAs and a 3-DE view of the airspace, on page 2 we lists the proposed changes if any for the areas listed by alternative.

Hope this information helps you understand the propose action of the project.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Karl Hoerig <khoerig@pascuayaqui-nsn.gov>
Sent: Thursday, January 20, 2022 1:51 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; Peter Yucupicio <Peter.S.Yucupicio@pascuayaqui-nsn.gov>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>
Subject: [Non-DoD Source] Re: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Dear Mr. Wakefield:

Thank you for providing the invitation to consult regarding the Air Force's plan to modify its use of airspace in Arizona.

Please note that the current Chairman of the Tribe, and appropriate primary contact for government to government consultation, is Mr. Peter Yucupicio. I have copied him on this communication.

The scheduled public meetings regarding the proposed actions are all located inconveniently for us. However, the Tribe has areas of cultural sensitivity that are located within the boundaries of the "Ruby Fuzzy" and "Tombstone" zones, as well as potentially in other areas. Can you provide detailed information regarding the Air Force's planned operational changes within those zones so that we can determine whether formal consultation with our Tribal Council is warranted?

Thank you,
Karl Hoerig

Karl A. Hoerig, Ph.D.
Tribal Historic Preservation Officer
Pascua Yaqui Tribe
7777 S. Camino Huivisim, Building C
Tucson, AZ 85757
(520) 883-5116
karl.hoerig@pascuayaqui-nsn.gov

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Sent: Thursday, January 20, 2022 7:50 AM
To: Robert Valencia <Robert.Valencia@pascuayaqui-nsn.gov>; Karl Hoerig <khoerig@pascuayaqui-nsn.gov>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

CAUTION: This email originated from outside of the PYT Organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To: holly@mathpo.org; holly@mescaleroapache.org
Cc: gaguilar@mescaleroapachetribe.com; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; Dana Banwart; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN
Subject: Arizona Airspace EIS Section 106 Consultation
Date: Wednesday, May 25, 2022 11:42:09 AM

Dear Ms. Houghten, during the current public comment period for the Arizona Airspace EIS we received the following comment submitted by a Mr. Joey Padilla, "We are concerned about the damage this plan will do to a sacred site that is very important for our heritage. We urge you not to do training flights in this area. Mescalero Apache Tribe"

We would like to respond to this comment but need additional information. Can you help us understand his comment and the general area that he is referring to?

Thank you,

Kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mil
DSN: 228-4035
Comm: (520) 228-4035

White Mountain Apache Tribe

Office of Historic Preservation
PO Box 1032
Fort Apache, AZ 85926
Ph: (928) 338-3033 Fax: (928) 338-6055

To: Joseph C. Turnham, Colonel, USAF Commander, 335th Wing

Date: January 27, 2022

Re: *Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona*

…………………………………………………………………………………………………

The White Mountain Apache Tribe Historic Preservation Office appreciates receiving information on the project dated; January 10, 2022. In regards to this, please attend to the following statement below.

Thank you for allowing the White Mountain Apache tribe the opportunity to review and respond to the above proposed intentions to prepare a EIS for Special Use Airspace Optimization to support Air Space Missions in Arizona.

Please be advised, we reviewed the consultation letter and the information provided, and we've determined the Special Use Airspace Optimization plans will have ***"No Adverse Effected"*** to the tribe's cultural heritage resources and/or traditional cultural properties, and we further support the United States Air Force missions in Arizona.

Thank you for your continued collaborations in protecting and preserving places of cultural and historical importance.

Sincerely,

Mark T. Altaha

White Mountain Apache Tribe – THPO
Historic Preservation Office

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Leon, Stuart
Cc:	KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; Dana Banwart; BREWSTER, CHRISTOPHER L GS-13 USAF ACC 355 CES/CEIE; TREECE, ALICIA M CTR USAF ANGRC NGB/A4; OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC; WALZ, ANGELA M Maj USAF ANG 162 WG/PA; HARTY, JENNIFER L GS-13 USAF ANG NGB/A4VN; KUCHAREK, KRISTI L GS-13 USAF ANGRC NGB/A4; TORIELLO, MICHAEL R GS-14 USAF ACC 355 WG/CPD
Subject:	RE: Consultation with White Mountain Apache Tribe
Date:	Thursday, July 28, 2022 2:56:47 PM

Thank you again for calling me this morning Mr. Leon, I hope we can develop a better relationship between the tribe and the Air Force.

I will check my schedule and that of other to see when a Zoom call can be done within the next few days.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mil
DSN: 228-4035
Comm: (520) 228-4035

-----Original Message-----
From: Leon, Stuart <StuartLeon@wmat.us>
Sent: Thursday, July 28, 2022 10:38 AM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
<kevin.wakefield.1@us.af.mil>
Subject: [Non-DoD Source] Consultation with White Mountain Apache Tribe

Kevin:

Thank you again for talking with me this morning. My contact information is below. I prefer you call my cell phone, but either number works.

Hopefully we can set up a time for a zoom call in the near future.

Take Care,

Stuart

Stuart C. Leon, Ph.D.

Director

WMAT Game and Fish Department

P.O. Box 220

Whiteriver, Arizona 85941

Office: 928-338-4385 x228

Cell: 505-217-8815

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Dana Banwart; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN
Cc:	OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; MATHEWS, ERIN K CIV USAF AETC 56 RMO/56RMO/ESMP; HOWARD, MARK R CTR USAF ANG AATC/162TRS/BGI; SHUMAKER, JON M GS-11 USAF AETC 56 RMO/ESMC; TREECE, ALICIA M CTR USAF ANGRC NGB/A4
Subject:	FW: Moapa Band of Paiutes THPO
Date:	Wednesday, March 30, 2022 2:00:32 PM
Attachments:	Salt Song Trail.docx

Just received this morning.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Darren Daboda THPO <moapathpo@moapabandofpaiutes.org>
Sent: Wednesday, March 30, 2022 10:46 AM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Cc: Laura Watters <chair.mbop@moapabandofpaiutes.org>
Subject: [Non-DoD Source] Moapa Band of Paiutes THPO

Good Morning Kevin,

Enclosed for your information, is a copy of "Salt Song Trail." The Moapa Band of Paiutes Tribal Historic Preservation Officer (THPO) interpretation concerning areas being impacted. The original reservation of Moapa River Indian Reservation was over 2.5 million acres in 1873 and areas described in background information in letter currently resident on public lands now. I hope this gives a better understanding when Moapa talks of cultural landscape being impacted of the reservation.

Here is a link to look at Salt Song Trail map and video (nativeland.org).

The concern Moapa Band of Paiutes THPO has about, "Notice of Intent to prepare Environmental Impact Statement for Special Use Airspace Optimization to Support Air Force Missions in Arizona" are the following: Noise Pollutions disturbing the pathway Songscape of the "Salt Song Trail"; the

Moapa THPO would like to review and comment on “Class III Cultural Inventory Report”; and be notified of any items found under “Unanticipated Discovery Plan.”

If any cultural resources are found around site please notify tribe.

If you have any questions, please contact Darren Daboda, THPO at (702) 277-4977 or moapathpo@moapabandofpaiutes.org.

Thank you,

DARREN DABODA
Tribal Historic Preservation Office
Moapa Band of Paiutes

1 Lincoln St
P.O. Box 340
Moapa, NV 89025

Telephone : 702 865 2787
Cell: 702 277 4977
Fax: 702 865 2875
Email: moapathpo@moapabandofpaiutes.org

Salt Song Trail

The original boundaries of the Moapa River Indian Reservation, when the tribe was established in 1873, included over 2.5 million acres of land in Southern Nevada that is impacted by public and governmental agencies. This area includes "Gold Butte National Monument, Tule Springs Fossil Bed National Monument, Lake Mead National Recreation Area, Pahranagat National Wildlife Refuge, Moapa Valley National Wildlife Refuge, Desert National Wildlife Range: (Hidden Forest/Deadman Canyon), Nellis Air Force Base, and Valley of Fire State Park." Our Ancestral lands impacted by public and governmental agencies includes "Mountain Charleston, Red Rock Canyon National Conservation Area, Sloan Canyon National Conservation Area, Spring Mountains National Recreation Area, Desert National Wildlife Refuge, Nevada Test Site, Nevada Tonopah Test Range, Creech Air Force Base, and Ash Meadows National Wildlife Refuge". In 1875 the tribe was reduced to 1,000 acres which, the community lives at now. Currently, the tribe has 71,954 acres and is working on "Southern Nevada Economic Development and Conservation Act" to restore about 41,000 acres.

The "Salt Song Trail" is a cultural landscape that is important part of our heritage, cultural, traditions, and holistic approach to the Southern Paiutes still practicing songs today and includes all of these lands. The Salt Song Trail is described as a "Songscape" (Cry Song) of "Traditional Ecological Knowledge" of the afterlife journey trail going through Southern Nevada, Southern Utah, Northern Arizona and Southern California (part metaphysical realm and old trails the spirit journeys) with "Salt Song Singers" and "Dancers (family, friends, and community)" performs with family from sunset to sunrise before the last songs sung at the gravesite.

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Karl Hoerig; Peter Yucupicio
Cc:	Dana Banwart; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject:	RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement
Date:	Monday, January 31, 2022 10:38:23 AM

Dr. Hoering, here are our responses to the questions asked in your 24 January 2022 email;

1) The Arizona Desert Wilderness Act of 1990 that established these Wilderness areas includes provisions that do expressly allow for low level overflight of military aircraft in those areas. This proposal does include lowering the operational floor for subsonic and supersonic operations in the Tombstone MOA. No changes to these operational floors are proposed for Ruby or Fuzzy MOAs.
2) The current exclusion area exists to avoid impacts to operations at Douglas and Bisbee airports. Aircrew training in the exclusion area does not occur below 13,000 ft MSL. Military and civilian overflights occur in this area as part of the terminal procedures at Libby, Douglas and Bisbee airports.

Please continue to direct questions/concerns as we continue in this consultation.

Thank you,

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Karl Hoerig <khoerig@pascuayaqui-nsn.gov>
Sent: Monday, January 24, 2022 2:40 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; Peter Yucupicio <Peter.S.Yucupicio@pascuayaqui-nsn.gov>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE <christopher.brewster@us.af.mil>; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN <grace.keesling.1@us.af.mil>

Subject: [Non-DoD Source] Re: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Mr. Wakefield,

Thank you for the information. A couple of follow-up questions: 1) Does the Air Force modify flight altitudes over the designated Wilderness Areas that are indicated within the zones? 2) Does the "exclusion area" in the southwest portion of the Tombstone zone indicate that training flights will not use that area?

Best regards,
Karl

Karl A. Hoerig, Ph.D.
Tribal Historic Preservation Officer
Pascua Yaqui Tribe
7777 S. Camino Huivisim, Building C
Tucson, AZ 85757
(520) 883-5116
karl.hoerig@pascuayaqui-nsn.gov

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Sent: Monday, January 24, 2022 1:51 PM
To: Karl Hoerig <khoerig@pascuayaqui-nsn.gov>; Peter Yucupicio <Peter.S.Yucupicio@pascuayaqui-nsn.gov>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE <christopher.brewster@us.af.mil>; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN <grace.keesling.1@us.af.mil>
Subject: RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

CAUTION: This email originated from outside of the PYT Organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To: Dana Banwart; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE
Cc: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject: FW: [Non-DoD Source] RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement
Date: Monday, January 31, 2022 10:12:01 AM
Attachments: image001.jpg

Just in from the Quechan Tribe.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Quechan Historic Preservation Officer <historicpreservation@quechantribe.com>
Sent: Monday, January 31, 2022 8:00 AM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: [Non-DoD Source] RE: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

This email is to inform you that we have no comments on this project. We defer to the more local Tribes and support their decisions on the projects.

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE [mailto:kevin.wakefield.1@us.af.mil]
Sent: Thursday, January 20, 2022 7:24 AM
To: executivesecretary@quechantribe.com; historicpreservation@quechantribe.com; scottmanfred@yahoo.com
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com); WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject: Section 106 Consultation Request Arizona Special Use Airspace (SUA) Optimization Environmental Impact Statement

Greeting, the Department of the Air Force (DAF) would like to invite your tribe into Section 106 consultations. The following installations are participants in this consultation, Davis-Monthan Air Force Base (DMAFB), Luke Air Force Base (LAFB), and Morris Air National Guard Base (MANGB).

The DAF has determined that for the purposes of Section 106, the current project is an undertaking that should be subject to Section 106 analysis. Section 106 for the current project will be carried out in parallel to the NEPA process, and the results of Section 106 will inform the NEPA analysis. The DAF is soliciting any comments or concerns you may have at this time regarding the project, and is seeking any information you might be willing to share regarding properties of traditional or cultural significance that you feel should be considered in any analysis of the project. The DAF will continue Section 106 consultation with your tribe as more information becomes available regarding the finalized Area of Potential Effect (APE), DAF good faith efforts to identify historic properties within the APE, determinations of eligibility and effect, and any proposed mitigation for possible adverse effects.

The DAF Point of Contact for this project is Mr. Kevin Wakefield, EIAP Program Manager, at Davis-Monthan Air Force Base. Please send him your comments and concerns to 3775 South Fifth Street, Davis-Monthan AFB, AZ, 85707-3012, or by email or phone at kevin.wakefield.1@us.af.mil or (520) 228-4035.
Thank you,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; Dana Banwart
Cc:	BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject:	FW: Government to Government Consultation Request Arizona Airspace EIS
Date:	Wednesday, April 13, 2022 3:32:56 PM

Just received from the Yavapai-Prescott Indian Tribe.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mi
DSN: 228-4035
Comm: (520) 228-4035

From: Linda Ogo <logo@ypit.com>
Sent: Wednesday, April 13, 2022 12:03 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Subject: [Non-DoD Source] RE: Government to Government Consultation Request Arizona Airspace EIS

Hello Mr. Wakefield,

Our office just received the hard copy on March 31, even though it was initially received and routed on March 15.
As a request for consultation under Section 106, it was recently reviewed by our Compliance Officer who should be contacting you within the next couple of days, if not already.
Thank you for your follow up.

Linda Ogo
Culture Research Department Director
Yavapai-Prescott Indian Tribe
530 East Merritt ~ Prescott, AZ 86301
PH: 928-515-7204

transmission in error, please notify the sender via e-mail.

From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Sent: Tuesday, April 12, 2022 10:38 AM
To: Elizabeth Cottle <ecottle@ypit.com>; Linda Ogo <logo@ypit.com>
Cc: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE <christopher.brewster@us.af.mil>; Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN <grace.keesling.1@us.af.mil>
Subject: Government to Government Consultation Request Arizona Airspace EIS

Greetings, the United States Air Force is following up on our request for Government to Government Consultation with your tribe. We originally send out our first request by email on 20 Jan 2022, followed up with an email on 14 Feb 2022. We then discovered that many of the emails sent did not reach the recipients.

On 11 March 2022, we send hard copy letter requesting Government to Government Consultation to the tribes we have not heard from. We would like to hear from you and your tribe regarding our request for consultation and any concerns you may have.

Please email me at kevin.wakefield.1@us.af.mil with any comments.

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
DSN: 228-4035
Comm: (520) 228-4035

From:	WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To:	Chris Coder
Cc:	Vincent Randall; Yavapai Culture; Dana Banwart; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject:	RE: Section 106 Consultation – Yavapai Apache Nation - EIS for Regional Special Use Airspace Optimization Arizona – Amended Notice of Intent
Date:	Wednesday, May 11, 2022 3:22:31 PM

Thank you sir, I will annotate that the consultation with the Nation is closed.

v/r kevin

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager
EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
Davis-Monthan AFB AZ 85707-3012
Email: kevin.wakefield.1@us.af.mil
DSN: 228-4035
Comm: (520) 228-4035

-----Original Message-----
From: Chris Coder <ccoder@yan-tribe.org>
Sent: Wednesday, May 11, 2022 12:00 PM
To: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>
Cc: Vincent Randall <vrandall@yan-tribe.org>; Yavapai Culture <YavapaiCulture@yan-tribe.org>
Subject: [Non-DoD Source] RE: Section 106 Consultation – Yavapai Apache Nation - EIS for Regional Special Use Airspace Optimization Arizona – Amended Notice of Intent

Hi Kevin.
Thank-you for the information regarding the EIS FOR REGIONAL SPECIAL USE AIRSPACE OPTIMIZATION.....Please be informed the Yavapai-Apache Nation (YAN) of Camp Verde has NO questions or concerns regarding this (USAF) project. Our only comment is that we support any tribal entity (cultural department) or Tribal Government that has concerns over cultural issues, which we are unaware of. This will be our only and final response to section 106 consultation. If you require further clarification do not hesitate to contact me by email at; ccoder@yan-tribe.org.

Chris Coder/Archaeologist/YAN

-----Original Message-----
From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE

[mailto:kevin.wakefield.1@us.af.mil]
Sent: Monday, May 9, 2022 10:51 AM
To: Chris Coder <ccoder@yan-tribe.org>
Cc: Dana Banwart (Dana.Banwart@cardno-gs.com) <Dana.Banwart@cardno-gs.com>; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN <grace.keesling.1@us.af.mil>; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE <kevin.wakefield.1@us.af.mil>; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE <christopher.brewster@us.af.mil>
Subject: Section 106 Consultation – Yavapai Apache Nation - EIS for Regional Special Use Airspace Optimization Arizona – Amended Notice of Intent

Greetings, the Air Force has Amended the Notice of Intent to extend the formal scoping comment period through June 3, 2022 to allow additional time for the interested public to review the proposed action and submit scoping comments. No changes have been made to the proposed action. The Amended Notice of Intent is attached for your review. We have also included a copy of the Published ANOI that appeared in the National Register on 4 May 2022.

The Amended Notice of Intent has no effect on the ongoing Government to Government Consultation with your tribe. We look forwarded to continuing consultation on this project as it moves forward.

Sincerely,

Kevin Wakefield, GS-12, DAFC
Base Natural and Cultural Resource Manager EIAP Program Manager
355 CES/CEIE
3775 South Fifth Street
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From: WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
To: Peter Steere
Cc: OBERRY, KEVIN M CIV USAF AETC 56 RMO/BEC; KEESLING, GRACE E GS-13 USAF AFMC AFIMSC/CZN; Dana Banwart; BREWSTER, CHRISTOPHER L GS-12 USAF ACC 355 CES/CEIE; WAKEFIELD, KEVIN L GS-12 USAF ACC 355 CES/CEIE
Subject: Comments Received From Chairman Norris Jr.
Date: Thursday, March 31, 2022 11:53:02 AM
Attachments: ~~Tohono O[redacted]2022.pdf~~

Good morning Peter, wanted to keep you in the loop. We received the attached letter from Chairman Norris Jr., it was sent to the contractor working for us on the Airspace EIS. The language in the letter sounds like he was unaware of our 20 Jan 2022 letter sent by email to you.

Mr. Kevin O'Berry is working to schedule the meeting requested in the letter.

v/r kevin

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